This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B 1,140,061

1837
ARTES VERITAS SCIENTIA
LIBRARY OF THE
UNIVERSITY OF MICHIGAN
TUEBOR
CIRCUMSPICE

HV
3011
.N53

Publications of the Red Cross Institute for Crippled and Disabled Men

Edited by Douglas C. McMurtrie

Series II

Numbers 1 to 3

New York
The Red Cross Institute for Crippled and Disabled Men
1918

Publications of the Red Cross Institute for Crippled and Disabled Men

Edited by Douglas C. McMurtrie

Series II

Numbers 1 to 3

New York
The Red Cross Institute for Crippled and Disabled Men
1918

Contents

Number 1. Vocational re-education for war cripples in France. By Grace S. Harper.

Number 2. Principles of design and construction of artificial legs. By Philip Wilson.

Number 3. Education and occupations of cripples juvenile and adult. A survey of all the cripples of Cleveland, Ohio, in 1916. Reported by Lucy Wright and Amy M. Hamburger.

AUG -3 1918
UNIV. OF MICH.

Publications of the Red Cross Institute for
Crippled and Disabled Men
Edited by Douglas C. McMurtrie

Series 2 March 4, 1918 Number 1

= New York. Institute for Crippled and
disabled men.

Vocational Re-education for War Cripples in France

by

Grace S. Harper
Chief, Bureau for Re-education of Mutilés
Department of Civil Affairs
American Red Cross, Paris

The Red Cross Institute for Crippled and Disabled Men
311 Fourth Avenue New York City

Contents

Page

Editor's Note 7

I. Introduction 9

II. System and Methods of Re-education . . . 13

III. The Schools Visited 45

IV. Interpretations and Conclusions 79

V. Program of the American Red Cross in France 95

Appendix I. Recent Legislation 99

Illustrations

Facing page

Entrance and chapel of the Red Cross Agricultural Center 5
The game-keeper's house and the woods 13
A blind soldier making brushes 20
War cripples learning carpentering 28
Working appliances for arm amputations 32
Special apparatus for one-armed men 33
Crippled soldiers in the hay field 36
A mowing machine for mutilés 37
Men with double forearm amputations at work . . 45
Tailoring workshop at Saint-Maurice 48
Saddlery workshop at Saint-Maurice 49
Toymaking at Pau 68
Vocational school at Montpellier 75
One-armed men at machine work 78
A recreation hall and a dormitory 80
Farm buildings of the Red Cross Agricultural Center 96
The Château and kitchen 97

UM

Entrance to the Ferme Courbat

The chapel

THE AMERICAN RED CROSS AGRICULTURAL
CENTER NEAR CHENONCEAUX

Editor's Note

THE present report, being an account of first-hand observations of re-educational work for disabled soldiers in France by one of our most experienced American workers with cripples, will have a special interest and value for those concerned in developing the program for similar work in this country. And it is now none too soon that such plans be decided upon and activity set under way.

The Red Cross Institute for Crippled and Disabled Men has a special interest in this report in that the suggestion that a study of French work be made, and that the services of Miss Harper be retained for the purpose, originated with the Institute's present Director, being transmitted through Dr. Edward T. Devine to Mr. Homer Folks, now Director of the Department of Civil Affairs of the American Red Cross in France. The study was made under the authority of this department. The manuscript was transmitted to the headquarters of the American Red Cross in Washington and thence to the Red Cross Institute for publication.

Two letters of transmission forming part of the report give further information regarding its preparation. The first is from Miss Grace S. Harper, Chief of Bureau for the Re-education of Mutilés, American Red Cross in France, to Mr. Homer Folks, Director of the Department of Civil Affairs, under date of January 12, 1918:

When assuming my duties as a worker for the American Red Cross in August, 1917, I was asked first of all to study re-educational work as developed in France on behalf of disabled soldiers, and to prepare a report on the subject. This report it was hoped might serve as a basis for such work in re-education as the American Red Cross might wish to undertake in France, and might also be of service in planning for re-educational work in America.

In accordance with these instructions I have visited the large cities and many of the smaller schools for the re-education of war cripples, and have discussed the forms of organization and training employed, with a considerable number of officials who are especially concerned with this problem. Numerous reports, books and pamphlets on the subject have been published both in France and England since the war began. A collection of these has been made and many of them have been reviewed during the preparation of this report.

As a member of the Permanent Inter-allied Committee on the Re-education of War Cripples, and Delegate of the American Red Cross at the London Conference, I have had the good fortune to meet and discuss re-educational measures with experts from other countries, and to obtain a better appreciation of the problem of the disabled soldier as it is being met by other nations.

I beg to transmit the report to you in the hope that it may in some degree serve the purposes for which it was undertaken.

The second letter is from Mr. Homer Folks to Major James H. Perkins, American Red Cross Commissioner for France, under date of January 14, 1918:

I beg to transmit herewith a report on Vocational Re-education of War Cripples in France, submitted by Miss Grace S. Harper, Chief of the Bureau for Re-education of Mutilés in the Department of Civil Affairs of the American Red Cross in France.

One of the first duties, which I was asked to undertake in connection with the American Red Cross in France, was to procure information in regard to the re-education of *mutilés* ih France, in the thought that the experience of France would have many useful lessons to America. We were fortunate in securing for this task Miss Grace S. Harper, widely experienced in the re-education of cripples, as Secretary of the King's Chapel Committee for the Handicapped, Boston, Mass., Director of the Survey of Cripples of Cleveland, Ohio, and Director of the Social Service Department of the Massachusetts General Hospital, Boston.

I beg to suggest that Miss Harper's report be transmitted to the American Red Cross at Washington with the suggestion that it be published for the information of those interested in this subject in America.

The publication of the report in its present form is made possible by the fund generously given by Mr. Jeremiah Milbank, for the establishment and conduct of the Red Cross Institute for Crippled and Disabled Men. It appears as the first number of the second series of publications of the Institute—a series of monographs dealing with various aspects of reconstructive work for cripples.

DOUGLAS C. MCMURTRIE

New York, March 4, 1918

I. Introduction

The following report on vocational re-education for war cripples in France is in no sense a thorough or critical study of the work which is being done. It was undertaken after an inspection of the principal French centres of re-education and with the intention of forming a basis for judgment on two points: (1) How the American Red Cross can aid in the problem of re-education for French *mutilés*, and (2) what material on schools, their organization, and equipment, may be of use in America. When sources have not been especially stated, information is based on opinions and statements given in personal interviews with French experts.

In presenting this report I want to make felt the cordial welcome and interest accorded to this mission of the American Red Cross on which I was privileged to represent the sympathy and eagerness to help on the part of the American people. Whole-hearted appreciation of the purpose of the mission was shown by public officials, physicians, and directors of schools, and this helpfulness has continued to evidence itself in offers of assistance in the work which the Bureau has since undertaken. A letter of authorization from M. Justin Godart, *Sous-Secrétaire d'État du Service de Santé, Ministère de la Guerre*, gave me all privileges necessary for obtaining whatever information was needed. In particular, I wish to acknowledge my appreciation for the ever ready counsel and advice given by Dr. Maurice Bourrillon, Director of the *Institut National Professionnel des Invalides de la Guerre.*

While preparing this report, the direction of the work of the Bureau for Re-education of Mutilés has brought me into close relations with a small group of officials in

Paris who are concerned with this subject. They recognize that organization for vocational re-education in France will have to be developed more effectively if the needs of disabled soldiers are to be constructively met. Organization depends on skilled personnel, and stress of war has kept many of the most experienced men at the front. Hence I have felt it no discourtesy to state impartially the limitations in organization as well as the strong points. But all who learn of the extent of re-educational training which France is now giving to her crippled soldiers will agree that the movement started by M. Herriot and carried on generously by public and private groups, has resulted in worthy accomplishment for a nation which has at the same time borne the heaviest burden of the war.

Perhaps the greatest problem confronting France now and when the war shall end, will be—not is there sufficient provision for giving training to disabled soldiers—but will they accept the offer to be re-educated? Less than four per cent. of the total number of the disabled have shown a desire to profit by learning new trades and this figure includes even *mutilés* who are being re-educated while still in military hospitals and who are therefore not wholly free as to choice.

France is sometimes referred to as having made it obligatory for her soldiers to be re-educated in order to become self-supporting. This is true in that re-education may begin while the *mutilé* is still under military authority and therefore must obey orders, whether it be orders for surgical treatment or for vocational training. But, because his 'reform' or honorable discharge may be granted before a course of training is completed, and because after 'reform' he is free to do as he pleases, this can hardly be considered as obligatory training in its broadest sense. Undoubtedly some means will have to be found by which re-education can be made to hold a greater appeal to disabled men. So far the French *mutilé* thinks of little else than getting back to his home, and quite naturally so after three or more years of separation from his family. A sympathetic understanding of this state of mind on the part of the wounded soldier is essential to any effective plans for giving him help.

American readers will perhaps find the discussion of the wounded man's point of view and the conclusions drawn from the findings as a whole most applicable to American conditions, though it is hoped that the detailed facts about the schools and organizations dealing with them will be suggestive in forming plans for re-educational schools at home.

It would seem to us that American workers might well give special attention to the following subjects:

1. Necessity of unified control.
2. Standardization of forms of organization and methods of training war cripples.
3. Study of remunerative openings in industry as a basis for selection of trade training to be offered in different localities.
4. Necessity for arousing the interest and confidence of the disabled soldier in re-educational training.
5. Coordination of effort between all agencies dealing with the cripple throughout the different stages of his treatment and re-education, until he is well re-established in civil life.

UM

The game-keeper's house where blind men will live

And where they will wander in the woods

THE AMERICAN RED CROSS AGRICULTURAL
CENTER NEAR CHENONCEAUX

II. System and Methods of Re-education

Plans for the vocational re-education of war cripples in France developed soon after the outbreak of hostilities. The initiative was taken by M. Édouard Herriot, Mayor of Lyon, who opened the *École Joffre* in December, 1914. This school with its annex at Tourvielle, just outside the gates of Lyon, is still one of the largest and best equipped re-educational centres in France.

In early 1915 the *Institut National des Invalides de la Guerre*, located at Saint-Maurice, was opened under the joint administration of the Ministries of War and of the Interior. Another of the early and influential groups which took up the question of re-education was the *Fédération Nationale d'Assistance aux Mutilés des Armées de Terre et de Mer* of which M. Maurice Barrès is president. Through the writings of M. Barrès, this Association has played an important part in creating public sentiment concerning the rights of the *mutilés*.

Following quick action by these pioneer groups many new schools were developed more or less independently through the Ministries of Agriculture, of Commerce and of the Interior, by public committees, departmental and communal, and also through private effort. Some of these schools have been created to meet the needs of crippled soldiers. Other preexisting ones have opened special departments which provide training for *mutilés*.

At the present time the total number of schools which provide some form of vocational re-education is 103. These vary greatly in size, in the scope of their activities and in their value. Some have so few pupils that they may almost be said to operate on paper only. The larger ones provide for receiving 200 to 300 *mutilés*, while many cannot accommodate more than 10 to 15 men. The larger schools are located in or near the important cities: Paris, Bordeaux, Lyon, Marseille, Clermont-Ferrand, etc. Smaller schools are scattered throughout 82 of the 87 departments of France. *Mutilés* from invaded districts are welcomed in all of these centres.

It is difficult to estimate the number of cripples that can be educated yearly in these schools, partly because—owing to incomplete registration—the total number of *mutilés* that the schools can accommodate is not known, also because the periods of training vary according to the trade. Some schools have for the same occupation longer or shorter durations of apprenticeship than have others. Some centres are able to retain their men until they finish their courses, while at others soldiers leave as soon as they are discharged from the Army. For this reason the yearly 'turn-over' for all the schools cannot be accurately determined. The National Office places the figures for the number of men who can be re-educated annually at from 7,000 to 8,000. This number compared to the approximated 300,000 war cripples to date,[1] with a monthly increase of 6,000 to 7,000, leaves a great lack in the extent of training available for even a portion of those who will probably need it.

GENERAL ORGANIZATION OF VOCATIONAL RE-EDUCATION

Little cooperation existed between the various organizations concerned with vocational re-education until April, 1915, when the Government undertook to establish coordination between existing activities, State, Departmental, and private, and assumed a measure of control over the future development of schools for vocational training of the disabled. On the initiative of the Minister of the Interior, an Interministerial Commission was formed to advise on demands for the establishment of new schools of re-education, on their organization, and on the allotment of State grants, always reserving the right of supervision if held advisable. This commission is composed of representatives from the Ministries of War, Labor, Interior, Marine, Agriculture, Finance, Public Instruction, Commerce, and the Department of Assistance and Public Hygiene.

---

[1] France, OFFICE NATIONAL DES MUTILÉS ET RÉFORMÉS DE LA GUERRE. Bulletin No. 1.

In March, 1916, the National Office for the *mutilés* and *réformés* of the war was created by a joint decree of the Ministries of War, Labor and the Interior.[2] The establishment of this National Office is a war measure; it has not been given a legal status.[3] Through this Office the efforts of the various ministerial departments are coordinated, their respective responsibilities being as follows:

The Ministry of the Interior is responsible for providing schools for vocational re-education and for the maintenance of men attending them. It controls the financial and administrative policies relating to all such schools of re-education even though technically they may come under the direction of any of the following named ministries.

The Ministry of Commerce directs all matters bearing on technical training in schools and centres of vocational re-education.

The Ministry of Agriculture directs special schools of agriculture and controls matters concerning the agricultural occupations in re-educational centres.

The Ministry of Labor and Social Assurance has charge of all matters involving relations with employers' associations, employees, trade unions, and the placement of apprentices in connection with centres of vocational re-education.

---

[2] *Journal Officiel*, March 3, 17; May 14, 17, 1916.

[3] See Appendix I.

The Ministry of War, though having no direct control in matters of vocational re-education has through the *Service de Santé* established an affiliation with re-educational groups by which *mutilés* still under treatment in military centres may receive trade training, both as a therapeutic measure and a vocational one. When re-education is carried on under this joint military and civil administration the War Ministry is responsible for the maintenance of the soldier and has authority in matters of discipline until he is discharged from the Army, when this responsibility is transferred to the Ministry of the Interior.

The object of the National Office is the coordination of efforts of public administration and institutions public and private, which concern themselves with cripples and *réformés* of the war; likewise the centralization of useful information with a view to improving as far as possible the work of the *mutilé*, and facilitating his placement. The three committees which direct the work of the office are:

1. *Committee of Administration.* Charged with general matters and the centralization of information relative to war invalids. Its duty is to maintain the services working under different titles with the cripples and *réformés* in constant relation with each other.

2. *Commission on Re-education.* Gives its advice on technical questions of re-education and on requests for State grants to centres of re-education.

3. *Council of Advice.* Brings together in one committee all those who are known for their special *œuvres* and all representatives of private societies. This council is particularly qualified to maintain general oversight of the interests of the crippled.

Since the establishment of the National Office and through its stimulus, committees on the care of war cripples have been formed in all of the eighty-seven Departments of France, excepting only those in the hands of the Germans.

WORK OF THE NATIONAL OFFICE

A system of registration of all war cripples is in operation, giving information on their civil condition, the nature of their disability, their previous occupation, and the one selected in the plan of their vocational re-education. By order of the Under-Secretary of State of the *Service de Santé*, individual blanks for medical data on the nature of wounds, extent of disability, etc., have been prepared by the medical authorities in all the hospitals. For this purpose and by request of the Minister of Labor, a nomenclature of disabilities has been drawn up by the consulting Medical Commission of the *Service de Santé*.

Between July, 1916—when this registration was begun—and December, 1916, 20,000 records had been received at the National Office from the *Service de Santé*. This registration is brought monthly up to date. An effort has also been made to reach all *mutilés* who had been discharged from hospitals and centres of physiotherapy previous to the time when registration was begun. Circulars were sent to the mayors of cities and towns and to hospitals, requesting information as to any disabled soldiers belonging to their Departments. Through this two-fold effort an approximately complete figure on the number of cripples to date was secured; 30,000 records relating to *Réformés No. 1* were collected, making a total registration of 50,000 to December, 1916.

As an aid in suggesting occupations which may be undertaken by disabled workmen, labor inspectors have made reports on the occupations actually being pursued by cripples in certain industries. This information has been secured mainly through work-accident cripples.

A registry of existing schools, their methods of operating, number of pupils, trades taught, placements made, etc., is kept on file at this office.

Requests made by cripples for vocational training either in schools or at apprenticeship, are also collected here. After inquiry into their physical condition, aptitude, etc., cripples are directed to the centres most suited to their needs.

A central placement service works in cooperation with Departmental employment committees and with private placement societies.

Statements have been requested from public and private enterprises as to positions in their organizations which could be filled by disabled men, and they have been solicited to reserve these openings for war cripples. Public administrations, railway companies, and private corporations have together indicated 12,000 positions in which *mutilés* could be used.

The Committee of Administration is paying special attention to plans for training teachers from amongst the *mutilés*. The Minister of Public Instruction has initiated beginnings by opening some courses for primary instructors. The *Service de Santé* has authorized visits to the wounded in hospitals, so that some estimate can be made of the eventual number of candidates for this field of training.

DEPARTMENTAL AND LOCAL COMMITTEES

France is divided geographically into 87 Departments and into 20 Regions, the regional partition corresponding to the Divisions of the Army Corps in peace times. Under the presidency of the *Préfet*, Departmental Committees include representatives of the military and civil administrations, medical profession, employers' associations, workmen's associations, cooperative groups, trade unions, and granges. These committees work in conjunction with the National Office in organizing work for the disabled. Schools and centres for vocational re-education have been developed and maintained in each Region by Departmental Committees aided by Local Committees. It is their duty to collect the cripples belonging to their Region from outside hospitals and centres of physiotherapy as quickly as possible, and to provide for their re-education and placement under conditions most favorable to their interests. Departmental Committees serve as a connecting link between the War Ministry and the Local Committees dealing directly with crippled soldiers.

PENSIONS AND ALLOWANCES

Pensions for war cripples come under the administration of the Ministry of War and are issued through the *Préfets* of Departments.

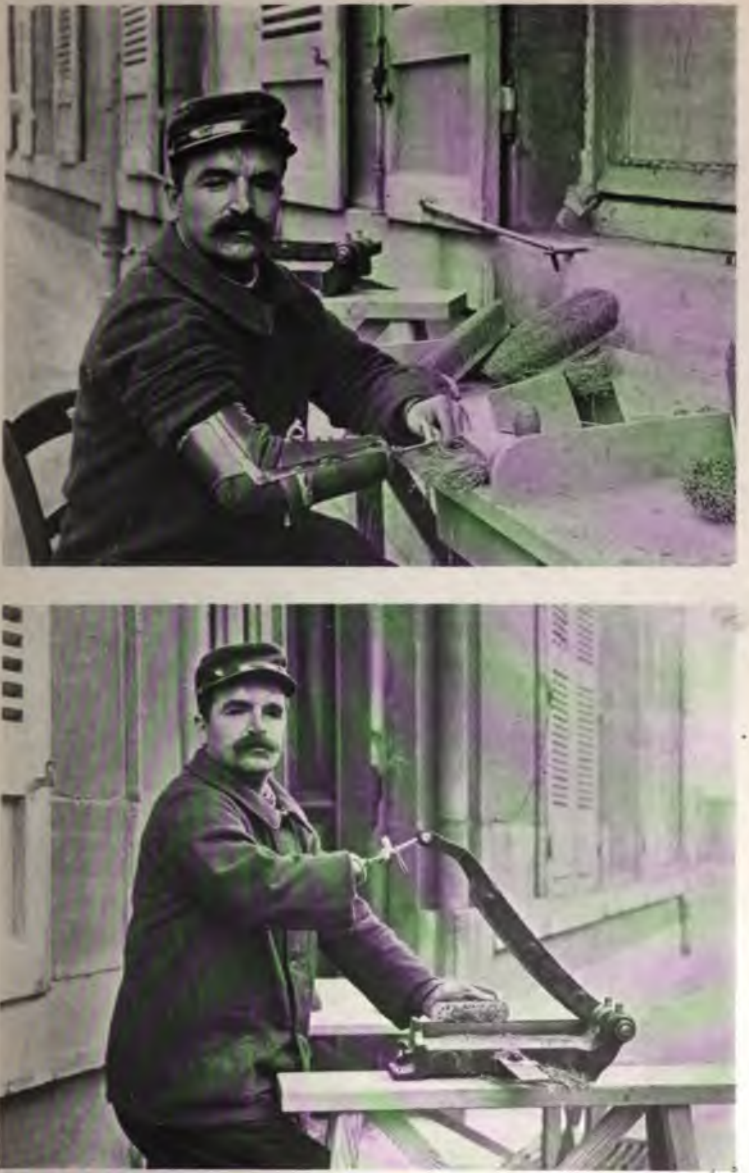
Soldiers discharged from military service fall within one of two classes, referred to as *Réformés No. 1* and *Réformés No. 2*. The term *réforme* is the equivalent to that of 'honorable discharge' from the Army. Differentiation is based on the origin of injuries, the first class including those whose injuries or maladies have been caused by events in active military service, and the second those whose injuries or maladies—such as phthisis—are not considered to have been received in active service. *Réformé No. 1* has a legal right to a pension, while *Réformé No. 2* has no such claim. Thus arises great hardship and sorrow for the latter and his family. A new law planned to prevent these injustices is referred to below.

Pensions are still regulated by a law dating from 1831 and are admittedly inadequate to present day needs. A bill providing for revision of these rates and for other changes has been framed by a special Commission on Civil and Military Pensions, appointed by the Government. (Section 2 h.)

Two systems are in use for compensating the disabled soldier classified as *Réformé No. 1*. These are the granting of permanent pensions and according of special allowances, sometimes called temporary pensions.

System of Pensions

Class of Injury	*Annual Amount in Francs*		
	Privates	*Non-commissioned Officers*	*Commissioned Officers*
Class I *A*. Total blindness or *B*. Loss of two limbs	975	1170 to 1820	2990 to 12600
Class II *A*. Loss of an arm or a leg *B*. Paralysis of two limbs or *C*. Equivalent injuries (hemiplegia, serious brain disease, dementia, aphasia)	750	1100 to 1400	2300 to 10500
Class III *A*. Entire loss of the use of an arm or a leg *B*. Equivalent injury due to tuberculosis, ankylosis of joints (stiffening), loss of one eye, complete deafness, loss of three fingers, etc.)	Add for each year of service to the amount due Class IV		
	7.50	10 to 15	40 to 175
Class IV Deafness in one ear, serious lameness or deformity of an arm or a leg, ankylosis of certain joints, etc.	600	700 to 1100	1500 to 7000



A blind soldier making and cutting brushes with aid of tools, especially designed by M. Lotz

MANOURY RE-EDUCATION SCHOOL FOR BLIND SOLDIERS

MU

Permanent pensions are due when injuries received in active service can be definitely diagnosed as of an incurable character and represent a degree of incapacity greater than the diminution of 60% of validity. The maximum pension for a common soldier is 975 francs a year, and the minimum is 600 francs.

Rates for pensions are based on the degree of incapacity and length of service and are determined by the equivalence of injuries to one of four classifications which range from complete loss of sight or amputation of two members, to conditions representing lesser degrees of crippling.

Pensions are a legal right and can be recovered by recourse to law before the Council of State. They are granted for injuries received, irrespective of the pecuniary condition of the *réformé* and once fixed they are permanent. Much difficulty has been met with in trying to establish this fact in the minds of disabled men who might profit by vocational re-education, but who fear a reduction of their pensions if their earning capacity is increased through training.

In order to secure more sound and uniform estimates of incapacity on the part of examining Medical Boards, a new consulting Medical Commission has been created to revise the *Guide Barème des Invalidités*, or disability table, which has been in operation during the war. The existing classifications are accepted as unsound, as for instance the granting of equal pension amounts for loss of an arm above or below the elbow.

Various governmental decrees dating from 1853 have established the system of *gratifications renouvelables* by which temporary allowances are granted when the degree of disability does not reach 60% diminution of validity, or when future incurability cannot be definitely determined. These allowances are not a legal right and cannot be contested at law. They apply only to common soldiers.

Allowances are renewable every two years after a medical examination. The last decree affecting this system of allowances was made in March, 1915, when a graded list of infirmities was established with corresponding compensation rates for each. The eight classes of injuries and disabilities as determined upon represent a permanent diminution of function or power to work, of from 100%, 80%, 60%, etc., down to 10%.

System of Renewable Allowances [4]

Rank	Loss of Function							
	1st Class 100%	*2nd Class 80%*	*3rd Class 60%*	*4th Class 50%*	*5th Class 40%*	*6th Class 30%*	*7th Class 20%*	*8th Class 10%*
	Frs.	*Frs.*	*Frs.*	*Frs.*	*Frs.*	*Frs.*	*Frs.*	*Frs.*
Private	975	750	600	500	400	300	200	100
Corporal	1170	900	700	582	466	350	234	118
Sergeant	1430	1100	800	666	533	400	268	134
Sergeant Major	1560	1200	900	750	600	450	300	150
Aspirant	1625	1250	950	791	633	475	318	159
Adjutant	1690	1300	1000	832	660	500	334	168
Chief Adjutant	1820	1400	1100	910	730	550	368	184

By this grading a common soldier whose injuries are not of a definitely incurable character may receive a maximum of 975 francs a year and a minimum of 100 francs according to the degree of disablement. For those whose injuries correspond to the first three classes an allowance may be converted into a pension at the end of five years, if the injury is still recognized as incurable. Allowances may be increased or reduced after biennial medical examination according to the amelioration or aggravation of the disability.

It takes from three to six months for the amount of pensions or allowance due, to be determined after a recommendation for discharge from service has been made to the Medical Board or 'Council of Reform'. During this period soldiers are considered as in process of 'reform' and are often allowed to return to their homes. On leaving a hospital they receive an allowance of 1.70 francs or 34 cents a day. If they enter a re-educational school, 1.20 francs of this amount is deducted for maintenance, leaving 50 centimes, or 10 cents, for pocket-money. When the amount of pensions or allowance becomes fixed, this daily allowance stops automatically. Allowances are paid quarterly and not in advance, which creates hardship during the first three months. The new law drawn up by the Commission on Pensions provides against this defect.

---

[4] *Pensions et Gratifications de Réforme.*

The *Médaille Militaire* or military medal, which is given to common soldiers for special bravery on the field of battle, carries with it an annual allowance of 100 francs.

In many of the re-educational schools amounts ranging from one to two francs a day are paid to soldiers receiving training. In some cases it is the custom to give part of this amount as pocket-money and the balance when the soldier leaves the school. Men not discharged from military service continue to receive soldier's pay during their stay in a centre of re-education. Separation allowances are continued to families of men who are in these schools.

On completion of training, premiums are often granted to a man who may need special tools for his trade, or one who wishes to start a small business for himself. A bonus, varying in amount, is sometimes given to a man whose work in the school has been especially satisfactory. This is in addition to any pay which he may have been receiving in the nature of wages. All bonuses and premiums given to soldiers in re-educational schools are paid from funds collected by private subscriptions.

EMPLOYMENT

At present there is little difficulty in finding employment for disabled men, and this is especially true of *mutilés* who have been re-educated in vocational schools. The problem of finding situations for their graduates has not as yet become an urgent one for schools to consider in connection with the trained *mutilés*. Because of the scarcity of labor in the country, large numbers of untrained cripples are working at good wages in munition factories and other branches of industry. When the war is over and able-bodied mobilized men return to their former employments there will naturally follow a weeding out of the physically unfit and unskilled in industry. Yet an appreciable number of these may not lose their positions at once, owing to the probable added demand that there will be for labor in reconstruction work.

By the law which reserves certain Government positions and employment in industries receiving State favors, approximately 40,000 of the disabled soldiers will be provided for until the time limit of five years following a declaration of peace has been reached (Section 2 h).

Those most deeply interested in the problem of re-education and employment, dwell repeatedly on the present tendency of employers to accept crippled soldiers because of the sentiment which is alive to their sacrifice for their country. They feel that this incentive will rapidly disappear when the war is over and that even now there is a noticeable diminution in the sympathetic attitude of the public towards crippled soldiers. Employment secured solely as such and without a basis of trained fitness for work is deplored by Dr. Maurice Bourrillon [5] and others who foresee an aftermath to this policy, which they feel will result in large numbers of untrained and unwanted disabled men. Strong sentiment exists against the crippled soldier being regarded as in a class apart, either by himself or by others. The Minister of Labor has especially instructed placement agents not to separate disabled men from the physically normal in industry. With the provisions which have been made by the State for accident insurance for war cripples, it is generally felt that disabled soldiers should be received into industries in competition with valid workmen and on a basis of equal pay for equal work. Because this can be accomplished only through re-education of those whose disability prevents them from continuing their former occupations, employment groups are urged to recommend soldiers to re-educational schools whenever it is thought advisable that they should undergo training.

---

[5] MAURICE BOURRILLON. *Comment rééduquer nos invalides de la guerre.*

Special war measures have been taken in France to meet the need of finding employment for disabled soldiers. By ministerial decree and in agreement with the Ministry of Labor, the War Office has established a National Placement Service which is located at Paris and works in connection with the National Office. In nearly all of the French Departments separate employment bureaus have been organized for *mutilés*. These bureaus work directly with the National Placement Service. The *Préfets* of Departments are presidents of these bureaus which are independent of civil Departmental Placement Committees coming under the Ministry of Labor, and which also have their central office at Paris. From February, 1916, when the Placement Service was opened, to October, 1917, 12,957 situations had been found for *mutilés*. During the last nine months when the system had become well established, the average number of placements per month was 432. During the first nine months after the Service had been established, 1,500 *mutilés* had been placed in munition factories and about 3,000 in other factories working for national defence.

The National Office issues monthly bulletins which give lists of opportunities for work for the disabled in all of the Departments. Each month a list is printed of positions not filled by the *mutilés* belonging to the various Departments and therefore open to outsiders. In each of these reports, when a place has been filled, the nature of the infirmity of the soldier is mentioned in connection with the kind of work undertaken.

A plan of cooperation has been worked out between the National Placement Service and ten large private placement groups working throughout France. Through an interchange of opportunities for employment, these combined societies have made 5,420 placements within a year and a half. Six of these private societies work chiefly in the Department of the Seine. A daily bulletin is issued by the National Office for the use of this cooperative group. The bulletin contains a list of offers of employment made to different societies but as yet unfilled. Indications of the occupation, wages, and requirements of the position open are stated. The society to whom the offer was originally made deals directly with cripples sent by other societies as candidates for the place. Each offer of employment is listed by number and cancelled by number when filled. In this way the men are not sent to apply for positions which are no longer vacant.

Any disabled soldier may apply at the National Placement Office for work. A physician who is in regular attendance examines each applicant and studies his physical capabilities for such employment as may be suggested by the placement agents. Individual records are kept; these give information on the military status of the *mutilé*, his family, education, former employment and nature of work desired. Under physical condition are noted: The nature of his disability, general health, and aptitude for work. A careful system of 'follow-up' has been worked out which checks up the final connection between the National Office, the employer, and the applicant for work.

LEGISLATION AFFECTING WAR CRIPPLES

Many bills have been proposed for the benefit of the disabled soldier but to date few of these have become law. The most important are: (1) those concerning compensation to war cripples who may become victims of industrial accidents, and (2) the law reserving certain civil employments (under given conditions) for crippled soldiers.

By the law of November 25, 1916, it has been enacted that whenever a crippled soldier or sailor whose physical disabilities have been received during the present war, shall sustain injury through work, and under conditions falling within the industrial accident laws now active in France, compensation shall be paid in case of death or of permanent reduction in working capacity. It must be proved that the accident was caused exclusively by the pre-existing war disability, and in case of permanent reduction of working capacity resulting from accident, that this has been aggravated in some definite degree by the fact of the pre-existing disability. Employers of such men are not required to pay the total compensation in case of death, nor the quota of the amount of compensation due in case of aggravated disability.

To meet these compensation payments a special State Welfare Fund has been created to which employers and insurance organizations are obliged to contribute amounts fixed each year according to recent laws governing industrial accident insurance.

As employers and insurance companies are taxed regardless of whether they are dealing with war cripples or not, this law overcomes in a measure, the tendency to exclude them from industry on the grounds of a predisposition to accident such as would involve an increase in insurance premiums and in the amount of compensation to be borne.

The law reserving certain government positions under special conditions for crippled soldiers and sailors has perhaps indirectly caused more harm to the ones hoping to benefit by it, than seems evident at first. By this law, and for a period of five years after the war shall end, war cripples will be given a right of preference for obtaining any of a given list of occupations specially outlined as not requiring the whole of a man's physical powers. This preference will be given always in favor of fathers of large families.

A special regulation determines the sort of injuries that allow a man the right to apply for these positions, which include government employment and reservation of certain places in all commercial and industrial enterprises which benefit by being given a monopoly, or receiving a subsidy from the State, Departments, or Communes. In the future, no industrial or commercial enterprise can obtain a monopoly or subsidy from public authorities except on condition of reserving for disabled soldiers and sailors such special employments as are specified.

The estimated number of positions listed up to the end of the five years' period following cessation of hostilities is 40,000. At the expiration of this time it is not obligatory that cripples be retained in places which they may be occupying. So far so good. But on the other hand the enactment of this law has unquestionably decreased the number of *mutilés* who might otherwise have applied for re-educational training, since many of them are looking forward to easy positions under the specifications of the law. There is a strong feeling that most of these opportunities should be granted to cases of arm amputation or

Disabled Serbians working in the carpentry shop Hospital No. 4 of the Orthopedic Centre at Lyon

Crippled French farmers learning enough carpentering (with aid of mechanical arm-apparatus) to do their own repair work

MU

injury, the number of which would of itself exceed the available openings.

PENDING LEGISLATION

Of the proposed laws affecting the interests of war cripples, the most significant is the new Pension Bill drawn up by the special Commission on Civil and Military Pensions appointed by the Government.

This bill provides for the revision and increase of pension schedules and for the reclassification of injuries and disabilities according to the resulting degree of incapacity for self-support in one's own trade. This degree of incapacity for work in a particular trade is recognized here as the only logical criterion for estimating the amount of damage sustained by each individual. A watchmaker or a tailor, for example, can obviously continue at his trade with the handicap of an amputated leg, whereas the same injury necessitates an entire change of occupation for a builder, an interior decorator, or sign hanger.

In case of total incapacity necessitating the assistance of an attendant, a fixed sum of 255 francs per annum is allowed in addition to the pension. This augmentation is renewable under the same conditions as 'renewable allowances'. A later modification to the bill[6] provides for an additional payment for each legitimate or acknowledged child under sixteen years of age. It also takes into account the rights and needs of *Réformé No. 2* for whom special allowances should be granted under certain conditions.

TYPES OF RE-EDUCATION CENTRES

1. The National Institute at Saint-Maurice, under control of the Ministries of War and of the Interior, is the only one of its kind in France and is administered jointly by these two State Departments.

---

[6] *Journal Officiel*, February 13, 15, 20, 21, 27, 1917.

2. Civil schools for vocational re-education created by public authorities and *annexed* to military Centres of Physiotherapy. These are called Centres of Physiotherapy and Vocational Re-education.

3. Civil schools for vocational re-education, but *not* annexed to Centres of Physiotherapy, and created either by public authorities or by private initiative.

SYSTEMS OF ORGANIZATION

1. Schools with professional workshops and boarding accommodations reserved especially for the disabled.

2. Hotel *pensions* allowing an apprenticeship in special workshops, or in ordinary vocational schools.

3. Corporative workshops organized by vocational groups for training of the disabled.

4. Individual allowances permitting the apprenticeship of the disabled in their home locality or near it.

All of the above systems are in operation. The *internat* or boarding-school system is universally employed as being most suited to the needs of the French *mutilé*. The fourth or 'allowance system' is most difficult to supervise and for this reason has only been applied to a limited extent.

The responsibilities of the various Ministries as already outlined apply themselves to the four following stages in the treatment and return of disabled soldiers to civil life.

1. Hospital care:
    Medical and surgical.
2. Convalescent care:
    Physiotherapy (functional treatment).
    Provision of apparatus and artificial limbs.
    Re-education in walking.
    Curative occupational work.
3. Vocational guidance.
    Vocational re-education.
4. Industrial placement and after-care.

No man is discharged from the French Army until his cure is as complete as possible, therefore, the *Service de Santé* has under its care convalescent cripples who, though still requiring treatment of one kind or another, may be physically capable of working at certain trades. In 1916, plans were made for providing vocational re-education for disabled soldiers while they were receiving care in Centres of Physiotherapy (military hospitals specializing in treatment for the restoration of physical functions). As a therapeutic measure occupation causes the cripple involuntarily to exercise his muscles in a way that purely mechanical aids do not accomplish. Because of this gain in functional re-adaptation, vocational training rightly commences while the *mutilé* is still under hospital care. The *Service de Santé* has not only recognized the advantages of occupation as a curative measure, but also its counter-influence against the ill effects produced by enforced idleness during convalescence.

COOPERATION WITH VOCATIONAL SCHOOLS

The means for supplying this training without creating new workshops were secured by enlisting the cooperation of vocational schools already existing in the neighborhood of the Centres. Civil schools when annexed to military hospitals for re-educational purposes usually reserve a certain number of vacancies for disabled men still under treatment, and the balance for those in the class of *Réformé No. 1*.

In each of the twenty military regions of France there is a Centre of Physiotherapy, eleven of which have shops for manufacturing artificial limbs and special apparatus. Annexed to these twenty Centres are either schools or workshops which *mutilés* may attend. The Centres which serve as models in the double rôle of supplying functional treatment and vocational re-education are the National

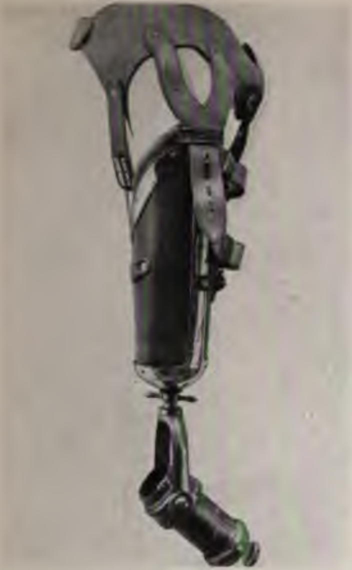
Institute for War Cripples, located at Saint-Maurice, near Paris, the *Grand Palais* at Paris, and the *École Normale et Pratique de Bordeaux*.

At the military hospitals of these Centres, functional treatment (massage, mechano-therapy, electricity) is provided and provisional work-apparatus is supplied pending the completion of permanent ones. Annexed schools for professional re-education are administered by civil authorities, the expense being partly met by State grants. The average length of hospitalization in these Centres is three months, after which further vocational training is a matter of choice with the individual.

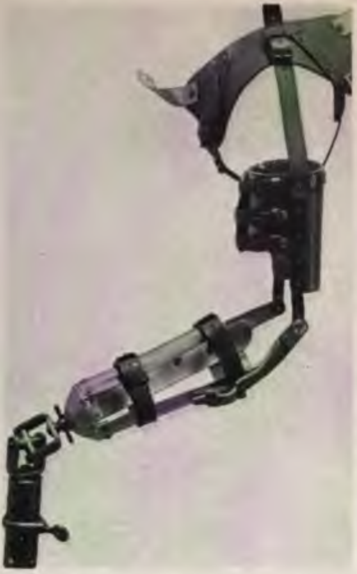
Although still under military authority the soldiers are, from the point of view of material subsistence, under charge of the Ministry of War, whether they are receiving functional treatment or only their vocational re-education. As soon as possible after 'reform', if soldiers continue at the school, their maintenance is given by the Ministry of the Interior through the civil authorities responsible for the *mutilés* in each Region. Many of the schools annexed to military centres receive and lodge a larger number of men in the class of *Réformé No. 1*, belonging to that Region. All of them are sharing their re-educational opportunities with cripples from invaded districts, as well as with the Serbians and Russians.

ARTIFICIAL LIMBS AND APPARATUS

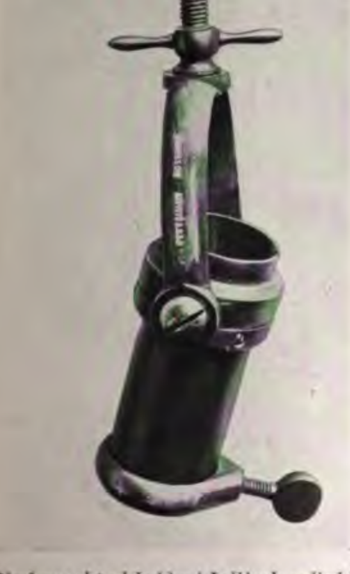
The responsibility for providing artificial limbs and special apparatus for disabled soldiers has been assumed by the French Government. These are manufactured at *Centres d'Appareillage*, sometimes by the re-educated disabled soldiers, but more often by mobilized experts. At least two Regions and often more, depend on each one of these Centres for their supplies of apparatus. Local manufacturers of artificial limbs are used to supplement



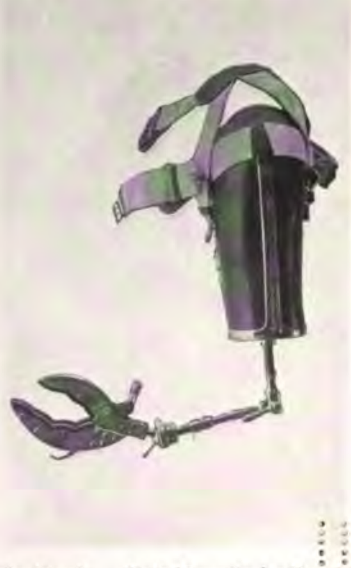
Tool-holder 'Jullien' called 'Agriculteur', with turning ring, adjusted directly to arm-apparatus



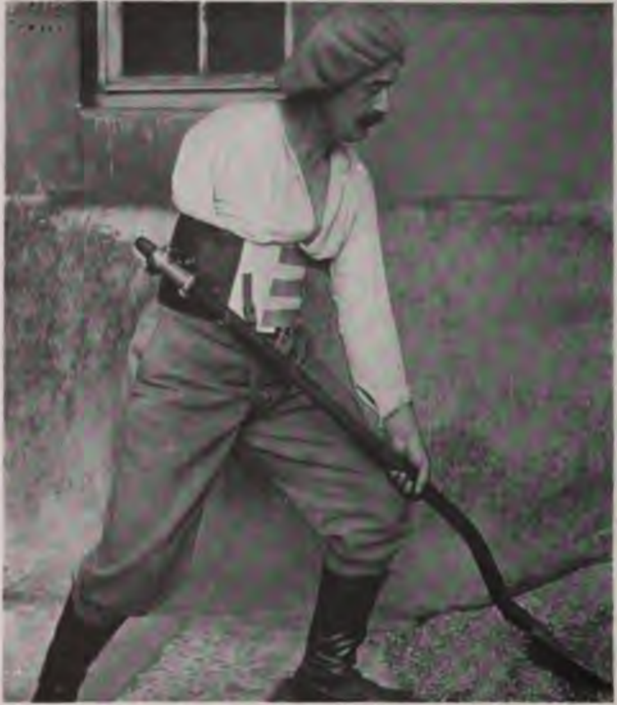
Aluminum work arm 'Gillet' Tool-holder 'Jullien' called 'Cultivateur', system 'Cardan'



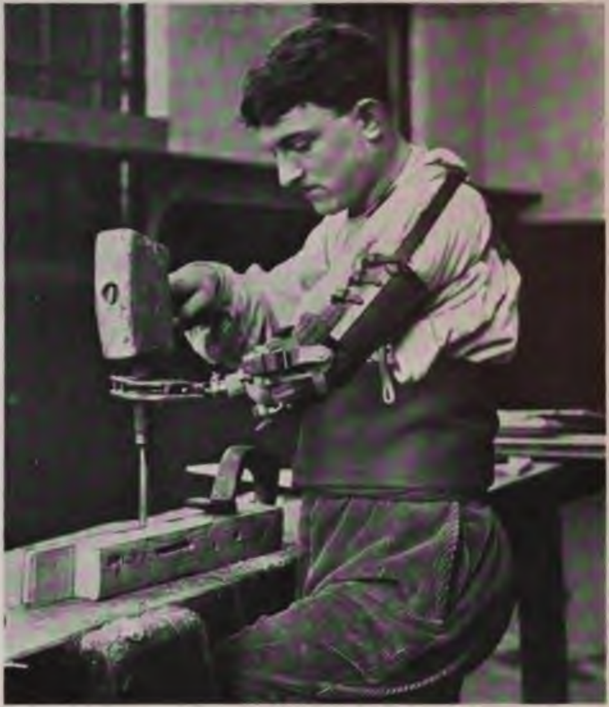
Universal tool-holder 'Jullien', called 'Agriculteur', with turning ring. This tool-holder can be adapted to all kinds of agricultural work



Grip 'Lumière' adjusted to an artificial elbow arm-apparatus



Belt with special apparatus for shovelling, model 'Jullien'



Mutilé mortising a block with aid of special grip, 'Lumière' the work done at the Centres, inasmuch as the demand for such apparatus is far in excess of what can be supplied without great delay. Each *mutilé* is entitled to an artificial limb or special apparatus from the State which guarantees to keep it in repair for his lifetime, through the manufacturing centre nearest to where the *réformé* lives.

Steady improvement has been made in the manufacture of artificial limbs since the commencement of the war, but as yet no standard models have been adopted for all centres. The Government aims to give a limb for work and one for 'parade'. The pilon, or crutch, sometimes articulated at the knee, is commonly provided for work. A special flat-bottomed arrangement has been adjusted to it for farm laborers, as the ordinary crutch-end sinks into the earth. The pilon is often so constructed as to permit the 'parade' limb with its shoe to fit on over it, thus lessening the expense of providing two limbs.

THE WORKING ARM

Very good working arm apparatus have been invented and many different devices are provided at the centres specializing in cases of arm amputation; Tours, Montpellier, Bordeaux, Lyon, and Toulouse. These *bras du travail* are not an attempt to produce a workable arm. They consist of mechanical sockets especially designed to hold tools in ordinary use in different trades and adjusted to the amputated stump by means of a leather cuff and straps. A universal joint allows the tool to adopt itself to any angle or balancing position required. Appliances have been invented to hold machinists' tools, agricultural implements, and other helpful devices such as a grip for plumbers' use, a holder for letters by a mail carrier, and a combination grip and hook for packing and shipping work. 'Parade' arms are made of wood—these have not yet reached that degree of perfection by which they can be claimed to give appreciable service such as a working apparatus can give. They serve as a physical replacement of the missing member for appearance, and not much more.

French artificial limbs are made with a view to durability, as the majority of cripples needing them are farm laborers. Effort is made to avoid delicate mechanisms which do not stand heavy service and are difficult for the *mutilé* to keep in repair. The early French models were made of leather with metal braces, and undoubtedly many of them were too heavy and too fatiguing to the wearer to be of great service. In almost all of the centres, changes in models are being made and wooden limbs patterned after American types are turned out in increasing numbers.

The American Red Cross (Department of Military Affairs) is working on the problem of artificial limbs with a view both to assist the French Government and to obtain data of value to the United States Army. Standardization of parts and enlarged output are the chief ends aimed at just now.

WORK OF THE MINISTRY OF AGRICULTURE

Because of the recall of a large proportion of skilled workmen from active service to industrial work for 'national defence', agricultural workers outnumber any other class of men now at the front. The losses to this sphere of industry have been heavy and the proportion of *mutilés* amongst them is increasing; sixty-five per cent. to seventy-five per cent. of the total workers maimed and amputated are of the farming class.

It has evidently been difficult for the Ministry of Agriculture to make satisfactory provision for the re-education of these cripples with such resources as were available at the beginning of the war. France has seven national schools of Agriculture, the special lines taught in each one varying according to the needs in the Region in which it is located. Two of these schools, at Montpellier and Rennes, were requisitioned as Military Hospitals by the *Service de Santé* up to early in 1917. Two others are still in use for this purpose.

In addition to these national schools there are twenty-one regional or departmental schools scattered throughout France. But the courses given in these colleges and schools were not adapted to the needs or to the educational limitations of the ordinary farm laborer. They were more especially equipped for training instructors and farm experts than for even the small proprietor, who in his turn may have had a better education as ground work for re-education than the average farm laborer. In these existing schools the Ministry of Agriculture has formed sections for training *mutilés* in practical farm work. Instruction of the crippled soldier is entirely separate from that of the regular school. In most sections an average of twenty *mutilés* can be received, but so far very few have taken advantage of these courses.

M. Chancrin, Inspector of Agriculture, states in a recent report [7] that up to April 1, 1917, only 830 *mutilés* had been re-educated in branches of farming. At the time 381 were attending schools. This figure places the average attendance of pupils per school at about 13. Re-education as referred to in this connection cannot always be understood as scientific training, inasmuch as some schools offer little more than a course in the simplest farm work, and the period is frequently limited to two or three months.

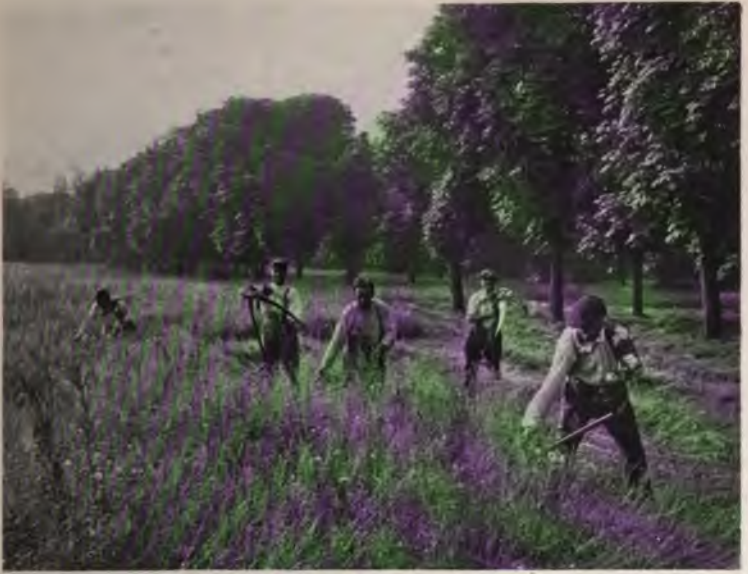
One reason for the poor attendance at these schools resulted from the lack of provision in the beginning for boarding the men. *Réformés* only were eligible as day pupils and they, as a rule, return to their homes almost immediately on discharge from the Army. The Ministry of Agriculture soon recognized that disabled men must be tempted to appreciate the value of scientific training by commencing their training during convalescence, and therefore while the soldiers are still under the direction of the *Service de Santé*. On this basis a few schools have recently been established near Centres of Physiotherapy or vice-versa. Courses are given in sheep-raising, gardening, general farming, dairy work and bee-keeping. These courses are short—six to ten weeks, and are more of the nature of re-adaptation to farm work than scientific training. Very little training in poultry work is offered. The industry of basket-making is taught at most of these schools.

---

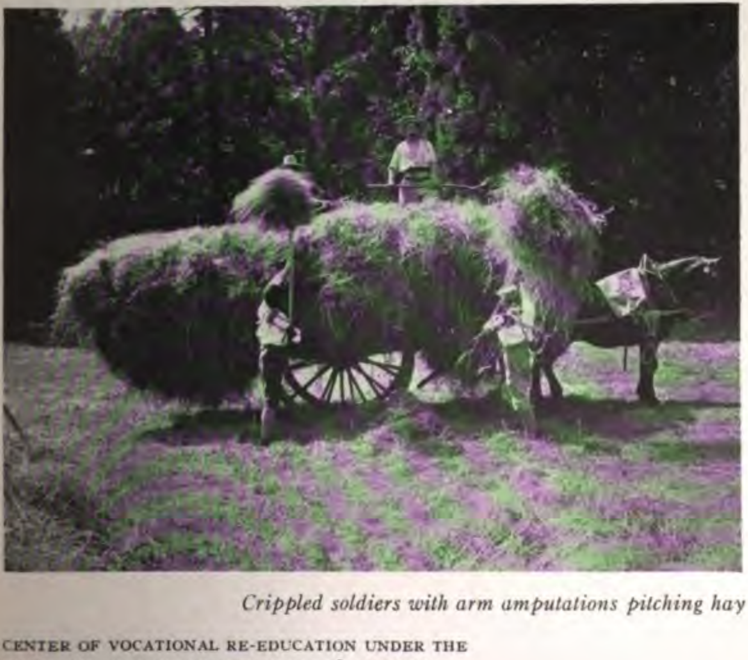
[7] *Conférence Interalliée pour l'Étude de la Rééducation Professionnelle, et des Questions qui Intéressent les Invalides de la Guerre. Rapports*, Paris, 1917.

In fourteen schools a special course is offered for operating and repairing agricultural machines, motor tractors, reapers, sowers, and binders. War has increased the need of developing motor culture in France and there has been a great demand for these crippled operators. The Government is using tractors for plowing land near the front and in the devastated regions as well as on the farms. It takes from six weeks to two months for a *mutilé* to learn to operate a tractor, and then he can earn as much as 6.50 francs a day in addition to board; mechanics earn as high as 18 francs per diem.

Universal opinion freely expressed by public and private persons, also through the newspapers, deplores the fact that this important problem of scientific training for the crippled farmer has as yet scarcely been touched. These maimed soldiers will have to provide food for France for some years to come, and only by using the most scientific methods will they be able to produce, in spite of physical handicaps, results approaching those which they previously obtained as able-bodied workers, and when in much greater numbers than at the present time.

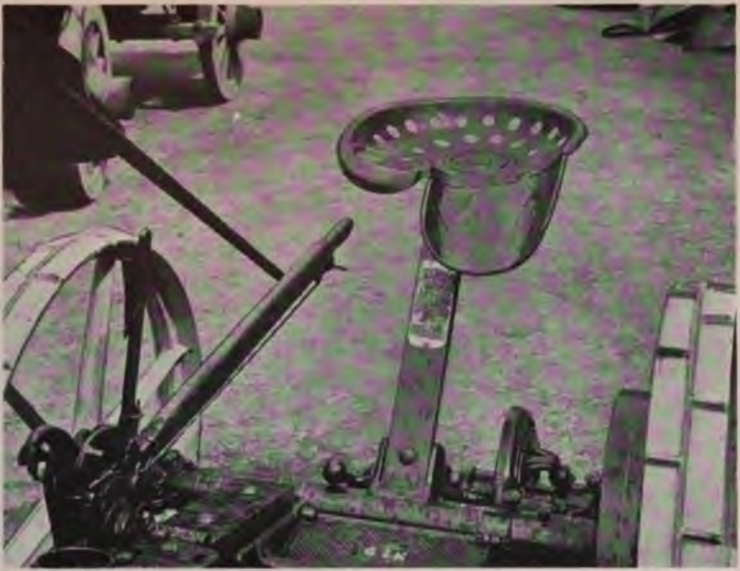


Four mutilés with arm amputations mowing hay with the 'Jullien' mechanical arm-apparatus



Crippled soldiers with arm amputations pitching hay

CENTER OF VOCATIONAL RE-EDUCATION UNDER THE
DIRECTION OF THE SERVICE DE SANTÉ AT LYON



Seat of a mowing machine modified for a driver with thigh amputation. Designed by M. Dor

Mutilé with thigh amputation driving a mowing machine Modified seat designed by M. Dor

CENTER OF VOCATIONAL RE-EDUCATION UNDER THE DIRECTION OF THE SERVICE DE SANTÉ AT LYON

Special study has recently been made[8] of the various crippling conditions under which disabled men may satisfactorily undertake given agricultural occupations. This analysis presents an encouraging range of opportunity for training and only excludes the multiple cripple from following some form of farming industry.

The following list of agricultural occupations which may be successfully pursued by certain types of war cripples has been prepared by M. Duchein, Director of the Agricultural School of Ondes:

1. Overseer (proprietor, farmer, worker on share system).
2. Small farming on the share system (labor).
3. Agricultural superintendent.
4. Gamekeeper.
5. Care-taker of properties.
6. Gardener.
7. Driver of agricultural machines.
8. Contractor for agricultural machinery. Mechanician.
9. Vine-grower.
10. Nurseryman and seedsman
11. Tree cultivator.
12. Cultivation of willow for basket-making industry.
13. Grazier (herb raising).
14. Cow-herd.
15. Dairy employee.
16. Butter maker.
17. Cheese maker.
18. Steeper and stripper of flax and hemp.
19. Cider maker.
20. Sheep raising expert.
21. Hog raising and fattening specialists.
22. Silk worm.
23. Small live stock raising.
24. Rabbit raising.
25. Fish culture.
26. Bee culture.

---

[8] *Service de la Main-d'Œuvre Agricole. Les mutilés aux champs.*

An excellent agricultural training farm for French *mutilés* is located at Juvisy, near Paris, and was organized in cooperation with the *Service de Santé* and the Ministry of Agriculture, by the *Union des Colonies Étrangères*. This group of foreigners is contributing its share of aid to France through assistance in re-educational work. The establishment shows what can be done along scientific lines toward re-educating disabled soldiers.

The Ministry of Agriculture has been specially interested in making it easier for *mutilés* to obtain small landholdings through loans made at special rates of interest. Through the *Credit Service Agricole* of which there is one in every French Department, two kinds of credit are available to farmers, 'long term' and 'short term' loans. By means of this loan system sums up to 5,000 and under certain conditions, up to 8,000 francs, can be obtained for payments on land, machinery, live stock, and wages for labor. Several bills have been proposed to the national legislature with the purpose of facilitating opportunities to acquire land on the part of *mutilés*. Easier credit terms are suggested in these propositions.

WORK OF THE MINISTRY OF COMMERCE

In March, 1915, a Commission was appointed to study the question of providing technical re-education for war cripples; for the adaptation of existing schools to this purpose and for the creation of special sections for technical training in other centres of vocational re-education for the disabled. That technical training in France had not been sufficiently developed before the war to meet needs of commerce and industry in peace times, has been a handicap in making provision for training crippled soldiers.

In cooperation with municipal and departmental authorities, the Ministry of Commerce has started three schools, and eleven sections in other schools, for vocational re-education. Most of these provide for the boarding and lodging of from fifty to seventy *mutilés* each, and for the training of a number of day pupils. The *École Normale et Pratique de Bordeaux* is one of the largest and represents joint effort on the part of the Departmental Committee on Technical Training, the Chamber of Commerce of the Gironde and the Ministries of War and the Interior. This school provides for 250 disabled soldiers. Special schools for *mutilés* have likewise been opened in the technical institutes at Marseille and Clermont-Ferrand.

In eleven other large commercial schools there are special sections giving courses in apprenticeship to *mutilés*. Of these the one connected with the National School of Watch-making at Cluses is among the most interesting. Courses here include all branches of watch-making and repairing, forging of instruments of precision, laboratory instruments, and fine electrical apparatus. The sections at Oyonnax and Saint-Étienne have been developed along local lines exclusively. Oyonnax is a centre for the celluloid industry, while at Saint-Étienne the principal object of the school is to train *mutilés* so that they can enter the iron industries of the Region.

The total capacity of these technical schools is about 900, not including the branch of 'placing out' of the school at Agen, which can find opportunities for about 400 men in local shops where they follow an apprenticeship and live either with their families or with their employers.

Under the Ministry of Commerce and with the aid of the Swiss Red Cross, a school for vocational re-education has been established at the prisoner's camp, Friedrichfield, Germany. Two technical teachers from among the prisoners are responsible for the organization and training at this school. French, Belgian, English and Russian war cripples are taught cobbling, tailoring, carpentry, and watch-repairing.[9]

DEPARTMENTAL INITIATIVE

Although most of the French schools for vocational re-education have been organized through the collaboration of a number of groups of people, both public and private, certain ones are more or less due to the special effort of *Préfets* of Departments and to municipalities. Sixteen of the largest ones can be credited to the efforts of these local administrations.

The *École Joffre* with its annex at Tourvielle has already been mentioned as the first school to be established after the war began. Before the close of 1915, following the example of the Mayor of Lyon, schools were opened at Bordeaux, Montpellier, Bayonne, Pau, and Brest. In 1916 another was opened at Lorient on the extreme western coast of France.

The Departmental Committee on *Rééducation des Mutilés* of the Seine opened a school in 1915 with provision for 200 *mutilés* to be boarded and instructed in trades.

The school at Saint-Étienne was organized by the *Préfet* of the Loire, especially for teaching *mutilés* the various branches of the iron industry peculiar to that locality.

The invaded Department of the Aisne has formed its Committee on re-education of *mutilés* and has its school, *l'École de Pavillon-sous-Bois* (Seine), just outside of Paris.

At Bourges a group of physicians organized *l'École de Bourges* where 200 *mutilés* from the Convalescent Military Hospital can be trained in workshops or sent into the town as apprentices in various industries. This school

[9] A.-L. Bittard. *Les Écoles de Blessés.*

is supported in part by the State and the Department of the Cher.

WORK OF PRIVATE SOCIETIES

It would be useless to attempt to sum up the work of private groups which in one way or another have interested themselves in the re-education of maimed soldiers. As might be expected when sympathy and emotion were so stimulated during the first years of the war, and with the wounded and crippled heroes returning from the front, many well-intentioned *œuvres* were formed to give occupation and training to '*nos blessés*'. If not quite non-existent now, some at least are becoming so through lack of funds and experience. Like the professional schools, these private *œuvres* came into being and flourished or not, quite without cooperation or knowledge of what was being done by other groups working in the same field.

The influence of certain of the largest associations has been very definite and has extended throughout France. Perhaps the most far-reaching has been that of the *Fédération Nationale d'Assistance aux Mutilés* which gives its aid to Belgian as well as to French war cripples. This Federation includes twenty-nine Committees for aiding *mutilés* in different French Departments and has a threefold aim: (1) to furnish appropriate apparatus when needed for special kinds of work; (2) to assist in placing at apprenticeship in trades suited to physical disabilities; (3) to find employment for crippled men.

The Association distributed funds amongst the affiliated Committees which carry on re-educational work in their own localities. Two agricultural schools have been established by this Association, also several training workshops which are planned on both the day and boarding school systems. Of the former there are four at Paris. Of these, *Atelier du Lycée Carnot* specializes in making tapestries and furniture coverings, while at the *Atelier Montespan*, wooden toys are made. A group of *mutilés* trained at this last workshop have combined to produce toys on the factory system, each doing one process only, and selecting such operations as are most especially suited to his physical limitations.

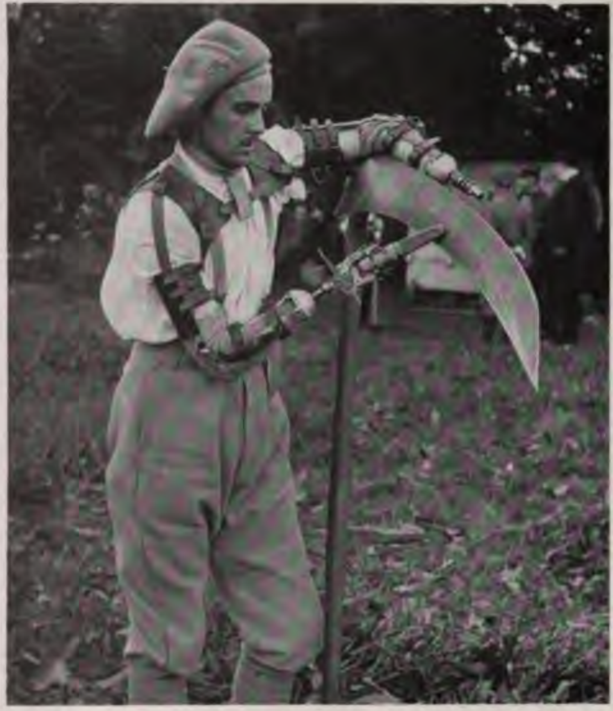
The *Union des Femmes de France* and the *Assistance aux Convalescents Militaires* have both been the means of starting schools for training disabled soldiers belonging to several Regions. These schools provide the usual courses, such as carpentry, cobbling, tailoring, bookkeeping, and picture-framing.

The society of *Les Blessés au Travail* does its work chiefly during the stages of hospital care when the making of simple articles affords mental diversion and encouragement to the patient. The occupational work done by this society has been extended into the field of vocational training at Dinard where they have established workshops for making toys and baskets.

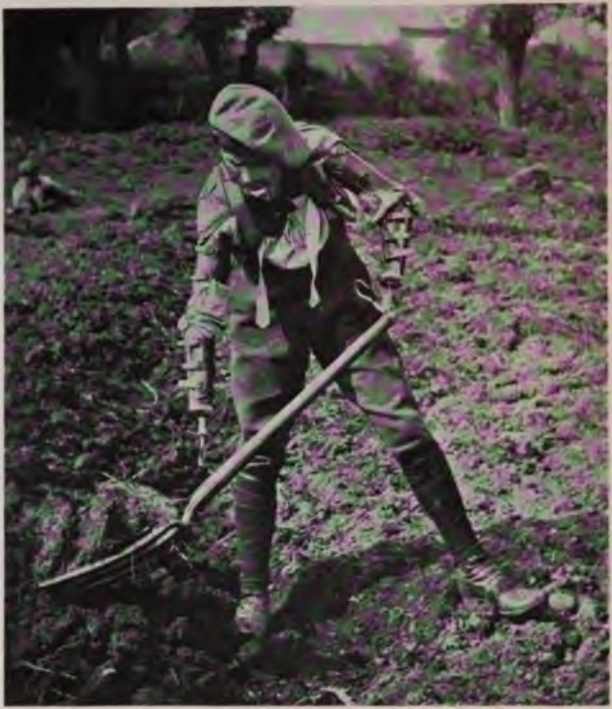
L'Aide Immédiat is one of the relatively few groups which has organized re-educational training on the system which allows a man to live at home and to be placed out at apprenticeship in a local workshop. This society has an average of 200 *mutilés* under its care for whom situations are found when they are ready for placement in industry. In addition, courses are offered in commercial subjects and training in left-handed penmanship.

One of the largest vocational re-educational schools annexed to a military hospital is at the Grand Palais, Paris. This school was organized by a group of foreigners living in Paris at the beginning of the war. It is one of four training centres which have been established by the *Union des Colonies Étrangères*, an association including a membership from all of the allied and neutral nations. This active group of friends of France have recently started two other especially interesting branches of work. Training in light occupations, such as paper-box making, for soldiers who are too incapacitated to earn a living, and the establishment of a farm which provides scientific training to *mutilés* in agricultural industries. This last one, the training farm at Juvisy, near Paris, was started for the purpose of employing the idle time of some 150 crippled soldiers at the convalescent depot of Juvisy, awaiting discharge from the Army. These soldiers are transported to and from the farm each day. Instruction is of three kinds: (1) agricultural work, including the practical work and reparation of motor machinery; (2) live-stock raising and the special industry of rabbit-breeding for the purpose of producing fine fur skins; (3) shop instruction in carpentry, machine and forge work.

Another form of private effort is that of cooperative workshops organized by trade unions. An association called *Atelier des Chambres Syndicales* (trade union workshops) has started shops which give training to *mutilés* and accepts them in the respective industries when ready to be placed. A trade union shop which manufactures fancy jewelry is one of the most popular of the Paris enterprises.



Mutilé with double fore-arm amputation and blind in the right eye, whetting a scythe by means of the grip 'Simon' and tool-holder 'Lauter'



Mutilé with double fore-arm amputation working with a spade. Right arm with single hook; left arm, ring-hook 'Aubert'

III. The Schools Visited

Seven of the nine large orthopedic centres combining functional re-adaptation and vocational re-education have been studied. These are at Paris, Tours, Bordeaux, Toulouse, Montpellier, Marseille, and Lyon.

Departmental, municipal, or private schools not attached to hospitals were visited at Tours, Bordeaux, Bayonne, Pau, Lyon, and Paris.

Because of the present exigencies and immediate need of a basis for action in aiding the French in their re-educational work, the trip was made as brief as possible. Schools located in the neighborhood of centres, but which owing to poor train service would require an extra day to visit, were omitted. Only the essentials on which fair judgment of needs might be based were gone into. This included inquiry into French methods and organization in their training of the disabled after three years' experience of the war, the adaptation of new trades to various physical disabilities, and provision for supplying apparatus and artificial limbs, especially working prostheses for the one-armed.

Because of the widely divergent industrial interests in different regions of France, some small local schools are essential, and examples were therefore included in the investigation. The two types of organization of Centres and the four systems of training in vocational re-education, were well examplified in at least one of the Centres visited, and therefore establish a good basis for comparison of standards of work and of needs.

I have not attempted to describe the work of all of these schools in this report, but have selected those having special interest from the point of view of organization and industrial specialization.

INSTITUT NATIONAL DES INVALIDES DE LA GUERRE
SAINT-MAURICE

This re-educational centre represents a vocational school annexed to an orthopedic centre which combines reparative surgery, functional re-education, and trade training. It has been administered jointly by the Ministries of War and of the Interior since May, 1915.

The Institute is installed in a group of buildings at Saint-Maurice, near Paris, which formerly constituted the National Home for Convalescents and the National Asylum for victims of industrial accidents. The hospital wards, dormitories, and workshops are grouped about three sides of a rectangular park, laid out decoratively in war-time vegetable gardens.

The two institutions as they formerly existed lent themselves fitly to the present needs, inasmuch as for several years before the war they had realized the dual conception of functional re-adaptation and trade training under the direction of Dr. Maurice Bourrillon. Dr. Bourrillon has had long experience in the industrial training of cripples and understands their psychology as do but few. He has studied systems and schools for training cripples in the Scandinavian countries and has for several years tried out various methods at Saint-Maurice. He ranks foremost among experts in this field of education.

The Military Hospital of 700 beds occupies the former convalescent home and is administered by the Health Service of the War Ministry. Seventy-five beds are reserved for invalids suitable for training in the workshops of the school.

All of the re-educational work, including maintenance of dormitories for *réformés* under training, comes under the administration of the Ministry of the Interior.

The two establishments operate conjointly and are parallel. A soldier may receive physiotherapeutic treatment and at the same time training in some selected occupation which will have a curative effect on his motor disabilities. By this method his functional re-education approaches its maximum in the quickest possible time. From the point of view of maintenance, he remains under charge of the War Department until any necessary apparatus has been furnished and until he has passed before the 'Council of Reform'. As soon as possible after discharge from the Army and for the remaining period of his re-education, his maintenance falls to the Ministry of the Interior.

The expenses of the Institute are included in the budget of the Military Hospital; State grants are diverted to this school and intended to cover these expenses. Private subscriptions are solicited for making loans to graduates who need special tools, and giving bonuses to cripples who do especially good work at the school.

The Institute represents two systems of training (1) the 'intern' system at the school where teaching workshops are installed and dormitories provided, and (2) apprenticeship in outside workshops with lodgings in a hotel *pension* maintained by the National Institute at Paris. In some cases where professions not offered at Saint-Maurice are desired, arrangements are made with special private schools and the soldier lodges at the Paris *pension.*

The Military Hospital is equipped for reparative surgery, physiotherapy, including massage, electricity, baths, mechano-therapy, and out-of-door gymnastics. There are three large operating rooms, three surgical dressing rooms and an X-Ray laboratory.

The workshops and dormitories at the school are in the former asylum for civil cripples. This building continues as it was before the war, except that one of the large dining-rooms has been given over to the hospital for an operating room. Sleeping-rooms accommodating three men each, open on a corridor which overlooks the park. All are light, clean and fairly good-sized for the purpose.

A small pavilion on the grounds is used for instruction in primary subjects. There is also a recreation hall for entertainments and lectures.

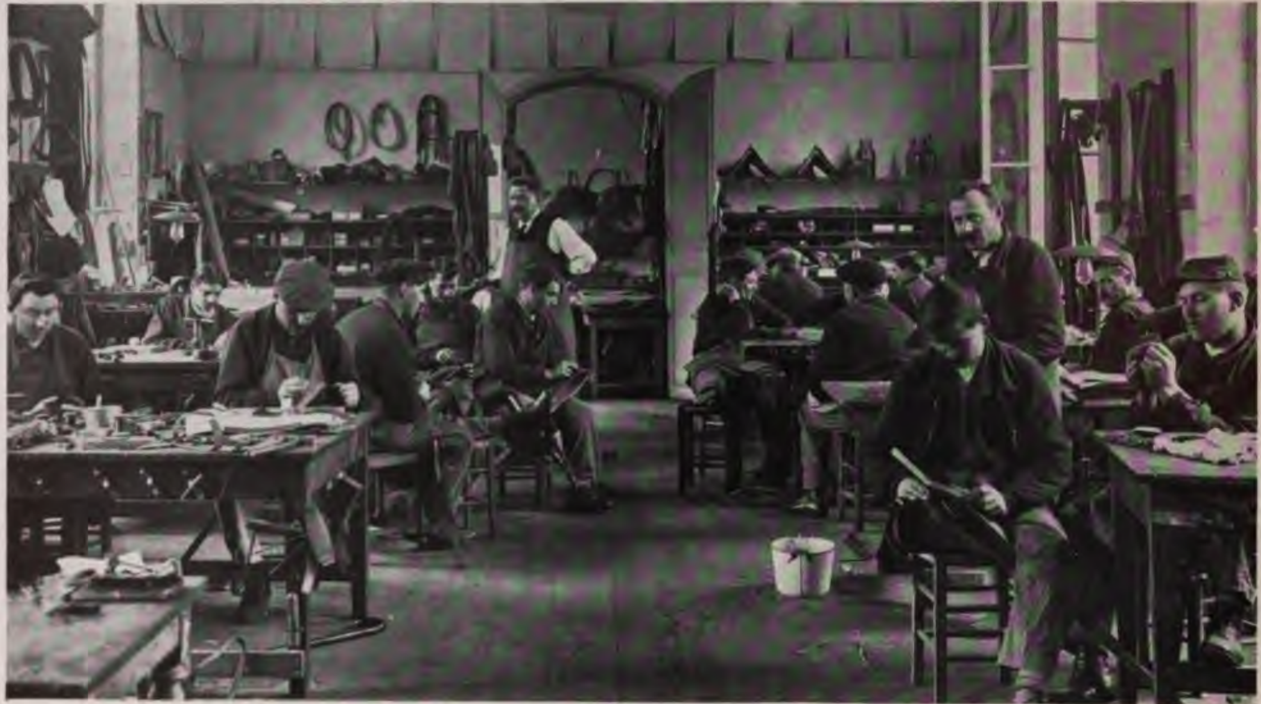
The dormitories can accommodate 300 pupils besides the 75 hospital beds reserved for *invalides* in training. There were several vacancies on the date of my visit. Dr. Bourrillon ascribes these vacancies to the three causes well recognized as detrimental to the men's morale: (1) the general opinion still prevalent that pension rates will be lowered if a man becomes industrially proficient as a result of trade training; (2) the nervous and mental instability following harrowing experiences of war; (3) the confidence which many hold of securing a *petite place* or government job.

All wounded soldiers and sailors, and *Réformés No. 1* are received here if incapable of resuming their former occupation. If in a hospital, a soldier may request to be transferred to the Military Hospital at Saint-Maurice, where he can receive trade training simultaneously with functional treatment.

Dr. Bourrillon advises and guides in the selection of a new trade after giving careful consideration to the former occupation, to the physical needs and limitations of each case, as well as to the man's preference. His long experience in the industrial training of cripples has fitted him for his rôle of vocational adviser from a technical standpoint, as well as from a medical and surgical one. This cannot be said of most surgeons undertaking this work.

Of the previous occupations in which pupils of this school were engaged before the war, agriculture heads the list and the building trades come second. Generally speaking, Dr. Bourrillon does not attempt to guide one-

Tailoring workshop at the National Institute, Saint-Maurice



Saddlery workshop at the National Institute, Saint-Maurice armed men into industrial pursuits. Some exceptions are made in the case of farmers who can be taught to operate motor-tractors. When suitable, men with arm injuries or amputations are given instruction in industrial design in a field allied to that of their former trades. Thus a *mutilé* whose previous occupation has been that of automobile mechanic may be taught draughting as applied to machines. Aptitude shown by various men in this application of re-education, here and in other schools, is most surprising. Discovery of latent ability has been a great stimulus in the work and is often sad evidence of wasted talent through lack of opportunity or misguidance.

The industrial section offers training in shoemaking, tailoring, tinsmithing, and harness-repairing. The commercial section includes courses in primary instruction, in commercial bookkeeping, and industrial design as applied to machines, buildings, and architecture. A third department specializes in teaching men to operate and repair tractors, agricultural machines, and automobiles.

One of the guiding principles of this school is to make the period of apprenticeship as short as possible. The men are anxious to earn, and after prolonged absence they are restless to return to their homes. Dr. Bourrillon makes the following estimates as representing the maximum periods of training sufficient to earn a livelihood; bookkeeping, four months; tinsmithing, six months; shoemaking and agricultural mechanics, eight months; harness-making, ten months; and a year for primary instruction of the illiterate as well as industrial design. Duration of apprenticeship in this last occupation varies greatly and is dependent in a great measure on the degree of previous knowledge within an allied field, on special ability, and other individual factors. These are short periods of training from the point of view of the old apprenticeship system when a man spent three or four years before being considered proficient. Here men are not expected to be expert when graduated, but by concentration on the essentials they are supposed to have learned enough to take positions and acquire further experience at the same time that they are earning a reasonable wage.

An average of sixty disabled men are being continually trained in the shoemaking shop. They remain here from five to eight months. This workroom is the most popular in the school and has an atmosphere of intense interest and application. The instructor is the President of the Shoemakers' Trade Union and is himself a mobilized soldier whose enthusiasm and pride in showing the men's work is keen.

Only sewing machines are used, otherwise the entire making of a shoe is done by hand. The course is divided into three sections of practical instruction. A month's training is allowed for plain machine stitching, seaming, welting, and soleing. At the end of five months apprentices should be able to re-sole shoes, both pegged and handsewn. Complete shoes for children, and for both men and women are made by *mutilés* of average ability by the end of eight months. These three series of work are supplemented by theoretical instruction in branches essential to carrying on the trade, such as, study of foot-forms, a knowledge of leathers, taking of measures, and how to deal with customers.

On graduating, men can earn six to eight francs a day. Necessary tools for working at home are given to them when they leave. Half of the men trained at this school were formerly farmers and return again to their homes.

The tailoring department is not as successful as might be desired and is soon to be discontinued. Here, *mutilés* evidently consider the minimum apprenticeship of a year as too long and few are ready to undertake it. M. Jules

Brissac, Director of Charity Institutions and Public Hygiene, states that experience shows that men trained in this branch and then placed in good positions have subsequently abandoned the occupation. He considers the long and tedious apprenticeship which has to be pursued before good wages are earned and the close confinement of the work as responsible for this result. Of twenty-five men who undertook the course within a year, three were found situations on graduation, twelve were dismissed or left without following the trade, ten were still at the school.

There are two sections in the department of industrial design, mechanical and building. Careful training in lettering is included. A course in ornamental design was tried but was given up at the end of eight months because not enough of the *mutilés* had the necessary artistic talent to make it worth continuing. Mechanical and building design have, however, been successful beyond expectation. The professor in this department is from the College of Arts and Trades in Paris, and when first approached on the subject of training cripples in this field, he emphatically said that there was no part which could be applied. He is now enthusiastic, as are all of the apprentices. Extra teachers have been added since the classes were started and two sections average from thirty to forty *mutilés*.

All parts of making harnesses by hand are taught, though the greater part of the business of this shop is repair work. Small leather articles, such as pocket-books and cigarette cases, are turned out as a by-product.

Quarters are cramped and there is not the air of industry and interest in this shop such as in the cobbling and metal rooms.

Fireless cookers, army canteens, and small tin articles are made by *mutilés* who are taught sufficient of pattern work, soldering, and joining to become journeymen of the trade. Only one apprentice out of the first twenty-seven who selected this course gave it up after his trial period. In rural communities it furnishes a fair living; men can earn six to nine francs a day.

With the more extended use of tractors and motor agricultural machinery in France, it is most important that mechanics should be trained to repair these special machines. A course has been offered at the National Institute for two years now, and as fast as the *mutilés* can be taught to operate and repair tractors they are sought by the Ministry of Agriculture to work in the devastated areas, as well as on untilled fields. General practical instruction in machine work is supplemented by theoretical courses in elementary electricity and the mechanism of gasoline engines. The men are given forge work on automobile and agricultural machine parts. Several models of engines are used, though the school is handicapped through owning none of these machines and having them requisitioned at any moment by the Government.

This is one of the most thoroughly serviceable branches of re-education which can be offered from the point of view of 'national defence'. *Mutilés* with one arm or leg amputated or injured can learn to drive a tractor. One man with a three-plow tractor can do the work of four men using two-horse single plows and in less time. One learned from the International Harvester Company that many tractors sold in France have lain idle in the past for want of skilled knowledge of how to care for and repair them when out of order. Now seems to be the time for the disabled soldiers to profit by the opportunities to learn and to increase the scale of farming in France after the war.

As had already been noted, there is little difficulty in placing a trained or re-educated *mutilé* while labor is still at such a premium. The school gives diplomas when courses are completed—sees a man into a job and welcomes his return there if for any reason he loses his position.

By maintaining the hotel annex in Paris, the National Institute offers opportunities not to be had at the school at Saint Maurice. *Mutilés* may lodge at the Annex and either attend re-educational schools in Paris or enter industrial shops as apprentices. Under this system it is difficult to supervise the men or their work, though under the right conditions it ought to be possible to obtain the men's cooperation and thus bring about more satisfactory results. Br. Bourrillon does not express encouragement over the success of this establishment. Attractions of the city and an increase of intemperance have gone a great ways towards breaking down character at the time most essential for rebuilding it.

Board is charged according to the man's earnings. If able to, they pay 1.60 francs a day. No man earning higher than 4 francs a day is permitted to lodge at the Annex.

ÉCOLES JOFFRE AND TOURVIELLE AT LYON

These two schools, the *École Joffre* and its annex at Tourvielle, will always have a strong hold on the imagination because of their almost overnight creation in behalf of the wounded soldiers of France. A little over three months after war was declared, M. Herriot, Mayor of Lyon, appealed to the City Council for support in starting this work which has since been heralded far beyond the boundaries of France, and whose founder may well be considered as the inspiration of re-educational training for *mutilés* of all nations. M. Hirschfeld, Director of the School at Tourvielle, makes one feel the energy and vision expressed by M. Herriot in the starting of this centre.

He tells of how within two weeks after the day when the Municipal Council approved the plan, the first *mutilé* "or to be mathematically exact, the first three *mutilés*" were grasped by their three hands and welcomed at the school by the mayor himself. Without waiting for the completion of the workshops or for a full staff of teachers ready and in line to formally receive classes of *mutilés*, he began with his three first comers and gradually built the school around them until it has reached its present capacity.

The *École Joffre* is situated in the city of Lyon and now specializes in commercial training for the one-armed and in the manufacture of toys. One-armed men for whom industrial work is unsuitable are taught bookkeeping, shorthand and left-handed penmanship, preparatory to filling minor office positions. The shops form four sides of a square courtyard—they open directly on to the ground and are light and attractive for work. Courses in commercial studies are carried on in an older building in which the *mutilés* also live, and where as many as 125 men can be lodged.

Toy-making is being studied here with serious purpose. A beginning has been made in the wholesale manufacture of toys on the factory system by which the making of separate parts is assigned to *mutilés* whose physical handicaps allow for easy operation of single processes only. A research expert is constantly experimenting on new models for manufacture. When I was there they had just perfected a papier maché horse, such as children ride on to 'Banbury Cross' and which, up to the present time, has reached Banbury Cross only by way of Germany. This model, though well made had no originality, nor did the other models, on exhibition. Unfortunately, mechanical toys have not as yet been undertaken here. These appeal strongly to children and one cannot help hoping that some school will have the courage to force this clever and lucrative branch of toy-making away from the *Boches*.

Two other forms of training are taught—bookbinding and bead-stringing. The bookbinding and pamphlet-making shops represent a high standard of work and a good output. I regretted that, owing to its being a vacation period, there were no *mutilé* actually at work in this *atelier* at the time of my visit. Bead work on the other hand is more of a therapeutic occupation than an industry and cannot legitimately be considered as vocational re-education, inasmuch as after receiving instruction there is no industrial field for work of this kind.

The annex at Tourvielle is just outside of the city of Lyon and was opened when the *École Joffre* could no longer accommodate the men who applied there for training. It is away from the noise and exciting attractions which a city possesses for the soldier returned from active service. M. Hirschfeld described to me the process of readjustment during the first few days before the soldiers become accustomed to country life. He spoke of the detrimental effect which their discontent has upon the others and then the gradual settling down and disappearance of restlessness which each man eventually reaches. The peacefulness of this country situation is sure to make for a better morale than city schools can hope to obtain.

I have been constantly impressed by the surroundings of many of these French schools, and especially with the beauty of the country at Port-Villez and Lyon. There are woods for the men to wander in and great expanses of country reaching as far as one can see. Many of the old Catholic convents and schools which the State confiscated when it separated from the Church have now been put into use for re-educational work. At Tourvielle, a long avenue lined with trees and bordered with flower and vegetable gardens leads up to the administration offices, and a little farther on are the workshops. A course in horticulture is one of the most important in this school. Eight long barracks enclose a rectangular section of the school grounds—most of the land outside of this section being cultivated by the *mutilés*.

My visit to these shops was one of the most interesting of the trip. They all represent small factories for the manufacture of galoches, tailoring, fur-making, fine cabinet work, shoemaking, wireless telegraphy, and special orthopedic work. Each one is fully equipped for the manufacture and sale of its product. There is no suggestion of military discipline. The atmosphere is businesslike, the men closely applied to their work, and apparently happy. I was told that they do not think of returning to their homes before being fully trained in their chosen trades. Eighteen months is none too long an apprenticeship for a tailor or a cabinetmaker, yet the directors of some other schools have said that *mutilés* will not remain for so long a period. Fur-making, cobbling, and horticulture average a year's apprenticeship at the school. The fur-making shop has already placed graduates with important Paris firms. This is an especially valuable branch of training because it enters a field of skilled German work; also because any new trade steers men away from the already apparently over-supplied industry of shoe-repairing. I say this, because after seeing the cobbling shops in these various schools and always finding a larger attendance in them than in any of the other shops, it is most difficult to believe that all of these re-educated shoemakers will be able to earn a living.

The administration of the centre is entirely civil in character and accepts mostly *Réformés No. 1*. The men are boarded and clothed free of charge by the school. No part of a pension or allowance is subtracted for maintenance and when soldiers are not yet discharged from service, they are paid one franc a day besides their soldier's pay of twenty-five centimes. An interesting and unusual form of bonus is being offered by M. Herriot to graduates, old and new. On the birth of each child (for as long as the school is in existence) he presents the child's re-educated father with the sum of one hundred francs.

All of the shops are managed on a business basis, and with the exception of the orthopedic apprentices, the monthly income from each workroom (after a deduction of fifteen per cent. for general expenses) is divided amongst the *mutilés* of that shop. Orthopedic workers are paid out of the receipts from the *Service de Santé* for which the school fills orders.

Five evenings a week, from seven to eight o'clock, the men are expected to attend a course of general reading. There is a good library for any who wish to take out books.

Amongst the various French publications on re-educational work, the report of this school written by its Director, M. Hirschfeld, with a preface by M. Herriot, Mayor of Lyon, is one of the best and most attractive. M. Hirschfeld reviews general re-educational problems as well as giving a complete description of the Tourvielle school. Striking illustrations by Frieda, the French artist, visualize some of the labor accomplished by *mutilés*. The '*Galochier*' is a wonderful bit of art in itself, and shows a rare sympathy for the man so handicapped—it pictures a cripple who by means of a mechanical arm, wields a blade of over a yard in length, and creates from a block of wood a picturesque and really serviceable shoe.

CENTRE OF VOCATIONAL RE-EDUCATION FOR WAR CRIPPLES AT AND NEAR TOURS

Tours, Saint-Cyr-sur-Loire, Amboise, Châteaurenault

There are four establishments at this centre, of which Sainte-Marie was the first to be organized, early in 1915.

The other three have been created as there appeared a need to extend the work for soldiers of the Ninth Region.

These institutions are administered by the society called *Assistance aux Convalescents Militaires*, a private group which has also started re-educational work in other parts of France. The work is divided into two sections, one for war cripples, the other for blind soldiers. The Villa Sainte-Marie provides lodging for one hundred *mutilés*, who are placed out as apprentices with employers in the town and surrounding country. A similar small institution with thirty beds was opened at Amboise when there were no more vacancies at Sainte-Marie. At the convent of Saint-Symphorien, twenty-five blind soldiers from the Region are lodged and given training in a few branches of industry. Very recently a small agricultural school has been started at Châteaurenault. This last institution cares for thirty crippled men, making a total of 160 who are being trained in the group.

The general administration of all these establishments comes under a Regional Committee which meets every three months. Financial and social questions are discussed, problems of general maintenance are decided, and reports are made. Decisions of the Council of Administration, which meets weekly with Directors of the institutions and with the Placement Agent, are ratified. This Council discusses matters of management and discipline, and any difficulties arising in the operation of the establishments, as well as the men's problems in apprenticeship. Directors of the individual establishments are chosen by the *Service de Santé*. The Council of Administration is composed of citizens from the Region, including a surgeon, an employer, and public representatives. The Government is represented by three delegates, one from the *État-Major*, a surgeon appointed by the *Service de Santé*, and a military comptroller. Serving on the Regional Committee are employers, bankers, physicians, and surgeons.

This Society is attached to the Ministry of War, but apparently has little interchange with the Military Centre at Joué-les-Tours. The State gives a grant towards maintaining the institutions, liberal subscriptions have also been made by public groups of the Ninth Region and by some private donors at Tours. In 1916, 20,000 francs were received from the State, with an additional sum for making over the convent as a school for blind soldiers. The same year, the city of Tours gave 11,500 francs. Various departments have also given generously.

The work of these institutions is centralized at an office in Tours, the placement department also being conducted here. The system of placing out at apprenticeship under supervision was first put into practice for war cripples by this Committee, and this centre is still considered to be the best example of the system in France. An advantage over the ordinary system of apprenticeship is gained by providing lodgings for the *mutilés* whereby there is a certain supervision over their unoccupied hours. By this arrangement the usual drawbacks, idleness, alcoholism and discouragement, are in a measure overcome. The Director at the *pension* keeps a careful attendance record and is in telephone communication with the employers in case the men fail to report for work or are ill and cannot do so.

By placing the men in workshops in the village, a great variety of trades can be offered. Moreover, the advantage of working in contact with other employees helps to bring back the man's interest in industrial life. Such a system, once started, can go on without the need of expensive workshops, and the apprentice learns his trade under conditions in which he will have to work when experienced. But the success of this system depends on the qualifications of the Placement Director. M. Charbrier is an exceptional person for this office. He is a citizen of Tours who gives his time to this work as a volunteer. He visits employers, seeks opportunities of apprenticeship for the *mutilés*, and advises and guides applicants when the choice of a new vocation has to be made. Rare judgment and discrimination are needed when placing *mutilés* with patrons. It is necessary to find employers who will have tact and consideration for the cripple, and who at the same time will be sufficiently unselfish and interested to teach him his trade as rapidly as possible. By selecting small employers who have at the most six or seven apprentices, one may secure for each pupil such individual attention as will enable him to master the various parts of a craft more rapidly than he would have opportunity of doing in a large shop. Results thus far would indicate that M. Charbrier has been most successful in securing advantageous openings for apprentices.

Before determining on a definite trade for a *mutilé*, he talks with the applicant, considers carefully his physical handicap and always directs him back to his former occupation, if this is feasible. If impossible, he tries to re-educate him in some line of work in which his knowledge and experience of his former trade may be used to advantage. M. Charbrier takes applicants to visit other crippled apprentices who are successfully learning the trade in which the *mutilé* is interested.

Difficulties arising between patrons and workmen are adjusted through personal counsel with each. The Placement Agent also constantly visits the men during their apprenticeship. Individual work records are kept on file in the office—many of these show a changing of trades on account of physical fatigue due to the nature of the occupation. Monthly reports are requested from employers, but M. Charbrier is visiting the men so frequently that these reports have little interest. He does not record visits or social adjustments. Being well known in the town, and a man of deep sympathy and understanding, he has had no difficulty in securing good cooperation amongst employers—this cooperation was most evident when I was visiting various shops with him. The old-fashioned type of master workman, who took a pride in teaching his apprentices and showed their work with enthusiasm, was met with here in Tours.

The apprentices were evidently happy in the freedom which this system allows, and perfect understanding seemed to exist between apprentice, employer, and supervisor. Two men whom we visited were learning to repair and to operate automobiles—each one had lost a leg at the thigh. Farther down the street we stopped in a cobbling shop to see a graduate apprentice and a beginner. The graduate was teaching the new apprentice.

In a fine cabinet-making shop M. Charbrier had placed a series of apprentices, who had done well with one exception. This one had thrown up his trade to the sorrow of a much-concerned patron. The man in training at the time of our visit had little use of his left arm, and all of the fingers of the left hand has been amputated. He showed us several cabinets which he had made and finished himself and which showed great perfection of work. On the street we passed a salesman who had been placed by the Society, and who greeted his counsellor with visible friendship. In a little upstairs watch-making shop, a man with a double amputation and another with a badly fractured leg were learning fine watch-repairing. From all these places, graduates have been sent out and now apprentices asked for.

Some of the industries least frequently offered for the training of cripples but available through this system are:

Fur-making, confectionery, cutlery, lace-making, electricians' work, and modelling in statuary.

Up to April, 1917, 382 cripples had been cared for in the two years that the system has been in operation. Of these, approximately two-fifths belonged to the Ninth Region, one-fifth to the invaded districts, and the remaining two-fifths to other Regions of France. Of the total number one hundred and twenty have suffered either an arm amputation or a severe arm disablement. Seventeen were disabled in, or had lost two limbs.

At first the men receive a very low wage from patrons, but the Society gives each man twenty francs a month whether he earns it or not. Half of this is granted outright for pocket money, the other half being kept until he leaves the institution. As an apprentice becomes skilled and his wages are increased to a point sufficient (with what he receives as a pension) to pay for his maintenance he is discharged by the Society as a trained workman. At the present time positions are easily available and the industrial placement of apprentices is not assumed as a direct responsibility on the part of this Committee. If there is need for assistance in this respect in the future, the Committee will undoubtedly meet it.

The one hundred apprentices working in Tours and the surrounding country are lodged and cared for at the Villa Sainte-Marie. This attractive château stands on high terraced ground overlooking the river Loire, and is ideal for its present use. It has been loaned by the owner for the duration of the war. Two upper floors are used as sleeping quarters, five or six men occupying a room. This use of private châteaux as is frequent in the present emergency, does away with some of the institutional atmosphere which wards and barracks holding long rows of beds invariably produce, though even here at the Villa Sainte-Marie each man has his bed, table and chair rigidly patterned after hospital equipment. There is no effort towards supplying any home comforts, except a linen and clothing room on the first floor where four kindly townswomen mend neat piles of shirts and stockings. The lack of comforts and homelike things is forcibly apparent here as elsewhere. A barrack outside the château is used for a dining-room; entertainments are also given in this building.

These institutions are all small and are outgrowths of the original foundation; of the three, only the school for the blind was visited. A friendly atmosphere prevails here, though one was conscious of the many unnecessary comforts which might have added to the happiness of these blind soldiers. Signs on the walls asking visitors not to show pity for the men gives the keynote of effort to make them independent of their infirmities. M. Robert, Director, was away on his vacation when I was there, but the officer next in command seemed very adequate for his task. He showed an understanding sympathy for the men and their needs. There are three workshops in which basket-work, brush-making, and chair-making are taught by competent instructors, two of them being themselves blind. Great skill was shown in some of the chair work, especially that done by a blind cripple who had lost one arm.

The greatest advantage of a small local school of this type is the easy communication it affords for the men to see their families frequently. There were seventeen in residence, most of whose families lived in the Region. The grounds are spacious and wooded, giving a restful influence to people cut off from normal activities. This school receives donations from committees working specially for the blind and seems to have whatever is necessary according to the usual standard of these institutions.

The centre is open to crippled soldiers of the Ninth Region, many of whom have come from hospitals of other departments or hospitals of the Region. At the time of my visit, the French Government had requested provision for a group of Serbians; fifteen had fallen to the lot of this Committee. M. Charbrier had already arranged for placement in the fur industry, of two men with leg amputations. They could speak no French, but the universal reputation of the Serbs for good dispositions and aptitude in learning has made them welcome in all schools.

When artificial limbs or mechanical apparatus are needed, they are supplied from the Military Centre at Joué-les-Tours. Dr. Boureau's mechanical work-apparatus are in common use for amputated arm cases, and especially at the Agricultural Centre at Châteaurenault.

CENTRE OF VOCATIONAL RE-EDUCATION AT JOUÉ-LES-TOURS

This centre is independent of the organization described in the preceding pages and has been in operation at Joué-les-Tours. The Military Hospital with vocational training shops annexed is primarily a centre for manufacture of special apparatus and artificial limbs. It is located a short distance from Tours in buildings which were constructed for tourists and cycling parties and had just been completed when war broke out. Low one-story stucco buildings surround a large square in which no attempt has been made to plant anything; hence the effect is barren and temporary.

Military Hospital No. 5 is under control of the Health Service of the War Office. It has 360 beds, all of which are constantly in use. Soldiers are admitted from hospitals of the Eighth and Ninth Regions and the Department of the Loire and Cher. To be eligible they must be in need of special apparatus or artificial limbs.

Their maintenance while at the centre falls entirely upon the Ministry of War, whereas the establishment and operation of the re-educational plant devolves upon the departmental authorities and is subsidized by the State through the Ministry of the Interior. The average period of hospitalization is three months, though this is entirely dependent on the rapidity with which apparatus can be manufactured and adjusted. There have passed through the centre since its transfer to Joué-les-Tours in January four hundred men.

Dr. Boureau who has charge of the re-educational work has devoted much thought to the re-adaptation of *mutilés* to agricultural industries and has perfected several ingenious and practical apparatus for men with arm amputations or injuries. Agricultural *mutilés* who can later return to farm work, he sends out by the day to neighboring farms, in charge of two instructors who assist them to re-adapt methods of labor to changed physical conditions.

For those who cannot continue with their former work the training shops offer instruction in cobbling, harness-repairing, watch-repairing, soap-making, mattress renovating, in short, all of the small trades which enable a man to become general utility expert in a rural community.

A provisional apparatus is made for a *mutilé* as soon as he arrives at the Centre. This enables him to work and receive training while his permanent one may be made and fitted, which is unfortunately longer than need be if the shops were not so handicapped here as elsewhere by lack of the labor needed to produce such vast numbers of new limbs.

More special orthopedic apparatus is manufactured here than in many of the Centres. A good boot is being made for supporting 'dropped foot', and an apparatus for paralysis of radial and cubital nerves is successfully in use.

ÉCOLE DE RÉÉDUCATION PROFESSIONNELLE DES MUTILÉS DE LA GUERRE AT PAU

In January, 1915, the city of Pau opened a small school for re-educating the *réformés* of the departments of the

Hautes-Pyrénées and the Basses-Pyrénées. The expenses of the school are met by the city and by aid of a government grant which is paid through the Ministry of the Interior. An administrative committee governs the institution for which there are three officials in charge of the trade training, the upkeep of the establishment, and oversight of the men's interests.

In a vast building belonging to the Banque de France, fifty *mutilés* are lodged, fed, and trained. The school is modest in its equipment and almost apologetic for its smallness, but for the very reason of its limited capacity the *mutilés* can and are being ministered to individually. Personal contact and mutual cooperation is evident in all of the relations between the men and the staff of the school and even a casual observer can see that *réformés* feel more like a large family than members of a training institution.

The variety of trade training offered is limited but such as is given is practical. Very serviceable reed and willow furniture is made, as well as toys which are designed on models peculiar to this Region. Ox-carts with oxen, interiors of peasant homes with firesides of local pattern, etc., are carved by the *mutilés* and with the most unpretentious equipment. Sandal-making is another local industry which yields a good income to a skilled workman who may be crippled in one or both limbs, without serious inconvenience to his trade.

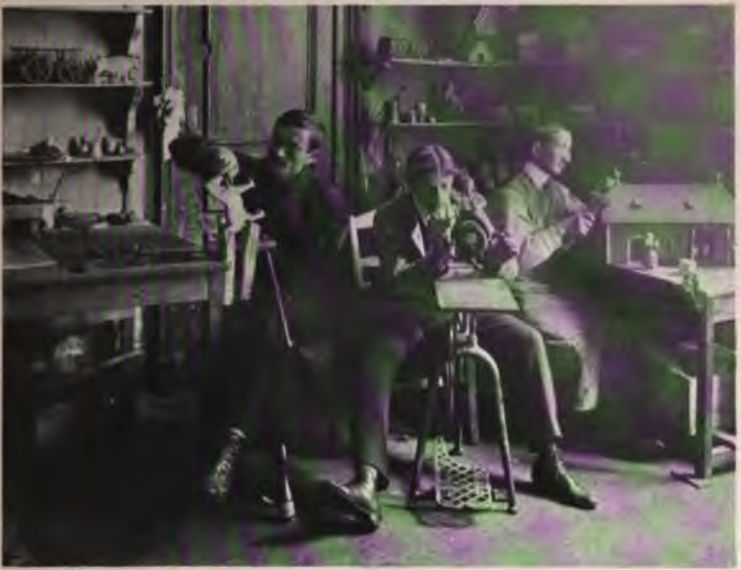
Cobbling is offered to those who desire to learn it, and evidently at some time *mutilés* have also chosen to weave domestic tapestry rugs, as was evidenced by a partly finished one set up on a large loom in a corner of the room.

The above trades are taught within the institution. There is as well a department for placing men at apprenticeship in the town; the *mutilés* meanwhile living at the school and being regarded as members of the group. Men placed out at apprenticeship in the town have been trained as chauffeurs, hair dressers, electricians, cabinet-workers, and picture framers. In the two years since the school was opened, ninety cripples have been cared for—fifty of them after about six months training have found good positions. The Director states that two years' experience of the school shows that in every case a re-educated *mutilé* receives a salary which in addition to his pension amounts to more than that which he earned before the war. He has estimated the expense of returning these men to civil life, prepared to earn a livelihood, at 675 francs or $135 for the six months training period. This includes lodging, board, light, heat, and expense of teaching and house personnel. This figure is extremely low; it bears out the impressions received while visiting the school that every franc expended is made to yield a maximum rate of interest in terms of skill and character building for the *mutilé*.

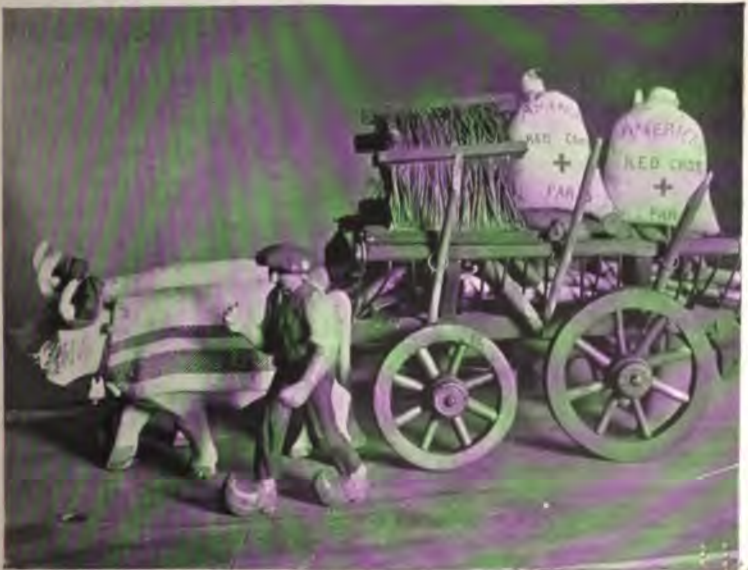
Small local schools such as this one at Pau, receive the not infrequent criticism that they cannot afford suitable equipment for thorough training and therefore cannot offer a sufficient variety of trades to attract men whose individual needs demand a wide range of choice. Both of these arguments are sound. But one must look at the other side of it. Here are men working under homelike conditions in their native locality and within reach of their families. Contentment goes far towards rebuilding moral courage as well as industrial skill. In France especially, different sections of the country vary greatly in the nature of their industries and certain ones peculiar to one part alone can best be taught at local schools. When a *mutilé* has special ability and should receive training along certain lines, or expresses a desire for such as may not be offered in a small school, it should always be possible to make arrangements for his training in a larger one. Men of this class at Pau are sent to Bordeaux, which is the official re-educational centre of the 18th Region and where artificial limbs and special apparatus are also manufactured for all the *mutilés* of that Region; this includes *réformés* from Pau as well.

The toy carving here deserves special mention both on account of the adroitness of the three men engaged in it and because they are constructing very individual toys from odd pieces of wooden boxes and covers, and with inadequate machinery. My interest was claimed on entering the room on seeing a one-armed man, his right leg also missing, standing before a vise and whittling an animal with the greatest dexterity. More recent connection with this toy making department has created a special interest, as machines have been furnished to them by the Red Cross and appreciation was expressed on the part of the three wood carvers in a joint production of which a photograph is attached. With the hope that it does not seem irrelevant to this report I am adding quotations from a letter received from the trio.

> Jean Arriebet about whom you will find a complete history in this letter, is the creator of the toy. Our little friend Cousseau carved the oxen, and your servant is the sculptor of the peasant and of the little details of perfection in the toy. It is these three then, who make you this humble present which is a very little thing beside all that you have done for us. . . .
>
> And because you are especially interested in our comrade Arriebet, I can on my own part sing his praises. Though amputated of his left arm and of his right leg, he is of a remarkable character and gives to his other comrades as well as to me, who are less wounded, an example of great courage.
>
> Left an orphan since twelve years old and son of an humble family of eight children, he earned his living as valet. Since the war has taken away his means of a livelihood, he has learned to carve toys.



M. Arribet, M. Cousseau, and M. Laulon carving toys. M. Arribet has lost his right leg and his left arm. Both of his companions have been injured in the leg



The toy they created at the vocational re-educational school at Pau

MU

Since we have worked together at the *École des Mutilés* with the hope of being able to later earn our livings, he has made remarkable things with marvelous dexterity and rivals me in spite of my two arms and aptitude for design.

ÉCOLE NORMALE ET PRATIQUE, BORDEAUX

The centre for vocational re-education at Bordeaux is both a normal school and a practical training-centre for war cripples. It re-educates disabled soldiers and from amongst them selects those who are fitted to be especially trained for work as instructors and assistants in other centres of re-education. The school has been developed through the cooperation of the Departmental Committee on Technical Training and the Municipality of Bordeaux, with the aid of Ministries of the Interior, of Commerce, and the *Service de Santé*. It is governed administratively and financially by the city of Bordeaux, and directed jointly by Dr. Maurice Gourdon and M. Lopès-Dias, Regional Inspector of technical training.

The special object of this school is the scientific direction of functional treatment for injured limbs (especially the arms) and the vocational training of the *mutilé* under such careful guidance as will result in a restoration of his maximum motor power and industrial fitness. To this end a special laboratory of physiological research has been equipped with machines for measuring functional capacity, power of muscular and nervous resistance, etc., similar to those of Dr. Amar at Paris. Every disabled soldier who enters the school is first examined in relation to his lesions, his general physical condition, functional capacity and motor sensitiveness, before he is advised in the selection of a new trade.

The examination takes into account the patient's degree of disability; the form, appearance, and dimensions of the injury being recorded on an individual history sheet. By various machines which the patient operates with his injured limb the degree of muscular power and fatigue are registered by tracings on cylinders. These indications are preserved for comparison with those of subsequent tests made periodically after training has been followed in the workshops. Any gain or loss in motor force is used as a guide in directing the practical work in the shops. There may also be a certain encouragement to the patient in having a visible record of any increased muscular power and control which the machines may indicate. For example, a carpenter's plane is so arranged that it is manipulated within a groove wide enough to allow for some deviation from a straight line. Any deviation of direction or unevenness of pressure in the use of the plane is visibly registered on a cylinder attached. A record is taken of the use of the plane by the instructor and serves as a standard of comparison. This enables disabled men to see how near their own control of the plane comes to that of the expert and to have evidence of their own increased power as a result of their shop work.

The Centre is equipped for orthopedic surgery and much reparative work is done here before men pass on to the workshops for training. Mechano-therapy, electricity, massage, and re-educational exercises are provided for non-surgical cases, such as contractions, ankyloses, and paralyses. After the patient has been studied in the special laboratory, measures are outlined which will develop the injured limb to its utmost capacity. The nature of the apparatus to be adjusted to the limb is also determined by these studies. Orthopedic appliances and artificial limbs are manufactured in five workshops on the premises. As far as I know, this is the only centre where celluloid is employed in their fabrication.

The school specializes in the re-adjustment of the one-armed man to various occupations, and is especially successful in adapting mechanical attachments to the patient's stump so that his arm is actually useful in certain trades. In the machine shop one finds cripples wearing these mechanical arms and at the same time making them for others.

Other workshops of interest are the bookbinding *ateliers* where the entire making of a book is taught; also a small studio where music is engraved by hand. Several men with arm injuries are learning wood carving. There are, as well, the trades of shoe-making, basketry, and harness-making. Courses of general instruction are also given in commercial subjects and in industrial design.

The workshops form four sides of a courtyard, the conventional arrangement in most of these schools. Those opening directly into the square are especially cheery and pleasant. When more room has been needed extra barracks have been erected; open from end to end they have plenty of air and light. At the time of my visit in August, men were working out of doors making rope-soled shoes, a specialty of this part of the country and one by which they can earn good pay. They were also raising vegetables on a small scale.

The school has dormitory space for 300 *mutilés* and accepts *Réformés No. 1* as well as crippled soldiers who are receiving treatment in the hospital. Since its opening in late 1915 and up to April, 1917 (a period of sixteen months), 1,044 disabled men have been received, though all of this number have not been re-educated in the vocational meaning of the term. The time spent at the school has varied from a few weeks to twelve months. For instance, it is not infrequent that a crippled soldier entirely loses confidence in his ability to resume work so that he has to be treated as a beginner and coaxed to exert himself until his self-confidence gradually returns. To see other cripples accomplishing results under similar handicaps, helps him, and often a short experience in the workshops will serve to show him that he can take up his old occupation again and therefore has no need to remain longer at the school. On the other hand some need to re-adapt themselves, under changed physical conditions, to the varied motions and strain of special occupations. It requires practice to manipulate an artificial limb successfully and with the least possible amount of fatigue to the wearer. For these two classes, the one needing moral encouragement and proof of ability to go to work, the other needing re-adaptation to changed physical conditions, the school has well served its purpose and men are returned to industry ready for a new start at their old trade.

In the Industrial Section, the school has received 773 pupils representing twenty-five different vocations practised before the war. Of these 20% have gone back to their former lines of work, especially industries of iron, wood, and agriculture. But the fact that 80% remain emphasizes once more the need of re-education. All the pupils of this section who have persevered and worked well during their apprenticeships, have obtained their diplomas, and have been placed by the school. They are earning, according to their work and disability, from five to ten francs per day. Others have been started in business in their own villages, by means of loans from the 'Association for the Assistance of Indigent Cripples'. These loans allow for purchase of materials, and for subsistence during the first few months of work.

In the Commercial Section two classes of twenty-five pupils each have graduated after an examination by a board composed of merchants and professors. Out of fifty pupils forty-eight obtained diplomas and have been appointed to positions where they earn from 150 to 200 francs a month.

NATIONAL SCHOOL OF WATCH-MAKING AT CLUSES

The National School of Watch-making at Cluses is an institution for the instruction and training of boys ranging from fourteen to twenty years of age, in watch-making, watch-repairing, mechanics, and electricity. A three years' course is given. The students have the option of specializing during the last two years, either in watch-making or in mechanics and electricity. Since it is a National or Departmental school, under the direction of the Ministry of Commerce and Industry, there are no tuition charges; students are obliged to find lodgings in the town of Cluses.[10]

In August, 1915, a two years' course was arranged for at this school on behalf of French *blessés* and *mutilés* of the war, that they might be given an opportunity to learn the trades taught here and to become self-supporting. A large room accommodating forty students was set apart in the main school building where the men are instructed and do their work. An annex accommodating about the same number of men has been fitted up with large windows, newly finished walls, and new benches and tools. Some of the *mutilés* are lodged in this same building.

Disabled soldiers from all the Departments of France are admitted, but are obliged to arrange for their own board and lodgings; which expenses they are able to meet in part with their government pension or allowance. Applications are filed in the order of receipt and admissions are arranged for as fast as vacancies occur so that the school is running at nearly its full capacity all the time.

As all the men are *réformés* the school is not attached to any hospital, but there is a physician to look after any illness among the students or the *réformés*.

---

[10] Report by Walter E. Wildman (American Friends' Unit), Bureau of Re-education of Mutilés, American Red Cross, Paris.

Pupils have the option of a two years' course in watchmaking or in mechanics. The *contre-maîtres* or shop directors are chosen from among the advanced and experienced students. Classroom instruction is given by the regular professors in the school for boys. There are about five *contre-maîtres* and five professors for the school. The *contre-maîtres* work with the men, judging and criticizing their precision and efficiency in execution.

Most of the *réformés* have been wounded in the leg, but a few wounded in the arm and hands are also doing very good work, since no great strength is required for operating the power-driven machinery or manipulating delicate tools of precision. It is an ideal kind of work for these men, because they can become quite as skilled as able-bodied men. They are only disciplined in regard to regular hours of attendance which are from 8 to 12 a. m. and 1:30 to 6:30 p. m., nine hours in all.

The lodging quarters of some of the men were visited and found to be rather uncomfortable, unkempt, and somewhat unsanitary. They are no doubt as good as many of them are accustomed to having and perhaps many are content to accept these privations for the reason that, in spite of their infirmities, they are preparing themselves for future support. However, comfortable quarters properly cared for would undoubtedly be instrumental in making more efficient men, raising their standards and ideals of living, and giving them a broader outlook and vision into the future.

For obvious reasons no special apparatus for accommodating a lost arm is employed. The work requires the greatest skill of manipulation which only a hand with sensitive nerves can properly execute. Quite a number of the men have artificial legs and can operate power and clutch pedals. The American type of artificial limbs is

Vocational school for war cripples of the 16th Region, at Montpellier always preferred because it affords better articulation and is very light and comfortable.

After their prescribed course has been completed the men in this school find positions as apprentices or as skilled mechanics with large firms or small employers.

All things considered, this is one of the most efficient and satisfactory schools I have yet visited and were it not for the great expense and number of years required for the establishment of so complete an institution, such a school might well be conducted in connection with an orthopedic centre, getting the men while they are still convalescent and under the care of the medical authorities.

VOCATIONAL SCHOOL FOR WAR CRIPPLES OF THE 16TH REGION, MONTPELLIER

The actual report on this school may seem much like a repetition of others, but, in reality, Montpellier is one of the most interesting schools which I have visited. It comes very near to attaining a social ideal, and one may certainly credit this to the personal influence of both Madame and Monsieur Dronsart who are responsible for its direction. Expatriated Belgians, they offered their services to the French Government soon after their arrival in France and because of their previous experience in Belgian training institutes, they were asked to organize this school at Montpellier.

There is little need to recount the various trades which are taught and which are much the same as in the other schools; shoemaking, tailoring, carpentry, wood-turning, machine work, industrial design, harness-making, tinsmithing and making of orthopedic apparatus. But the vital interest here is the consideration given to the men's life as a whole; the understanding and appreciation which recognizes that a man who has become maimed and who has to be industrially retrained, may also have other needs in the way of stimulation, interest in his home, his mental life, and his desire for amusement. All of these find expression in the services of Madame and Monsieur Dronsart.

Take for example the encouragement that the men are given in reading. A professor from the Montpellier Institute, and I may add that Montpellier is one of the intellectual centres of France, gives a talk to the *mutilés* on some French author or poet, and simultaneously, books by these writers are placed in the library. The result is a foregone conclusion; books are taken out and are eagerly discussed after which, during a second conference, the men take part in expressing their opinions and tastes. When M. Dronsart told me of these conferences, he said: "For example, we have a talk on . . . (I have to confess that I did not know the writer mentioned) and do you know, the next day there wasn't a book by that author left in the library!" I understood then, when I saw his eyes light up with keenness and enthusiasm, the source of interest and the unselfish whole-heartedness that made it possible for him to reach these *mutilés* socially.

The Montpellier school is in size about the same as that of Tourvielle. About 360 men are boarded and trained in the institution, which is a regional one, and which extends a welcome to *mutilés* from the invaded departments as well as to those from other regions. It is affiliated with the military hospitals of the city, and in this respect is attached to the Health Service of the War Ministry. *Mutilés* in hospitals are eligible, as well as *réformés;* they can attend as day apprentices, if desirable. Four out of the six departments of the 16th Region look to this centre for the re-education of their disabled soldiers; out of a total attendance for two years and a half, almost 50% of the apprentices belonged to these four departments. Approximately 40% came, either from invaded districts or other regions; the remaining 10% belonging to the two departments of the 16th Region which have organized local schools of their own. The three general divisions of work of the school are:

1. Training in trades, and instruction in commercial subjects.
2. Placement in industry on completion of apprenticeship.
3. Design and manufacture of mechanical work-apparatus and orthopedic appliances.

The number of *mutilés* who have been industrially re-educated since the opening of the school in August, 1915, and up to May, 1917, is 961. This figure does not include 120 disabled men for whom re-adaptational measures have been followed, such as practice in farm work with use of mechanical arms, training in left-handed penmanship, and other forms of education.

Commercial instruction is in greater demand than industrial training; the general preparatory courses having educated the greatest number of any department in the school. It is always surprising and interesting to see a number of older men attending these courses—closely applied to their books and showing an eagerness for learning which they evidently never have had an opportunity to acquire before. Excellent work is done in these sections which fit *mutilés* for general clerical work. Book-keeping comes second in popularity and left-handed penmanship third. These three courses have trained respectively 161, 152, and 150 *mutilés* in a little over two years. In the industrial section, cobbling shows the largest enrollment and next to it comes machine work.

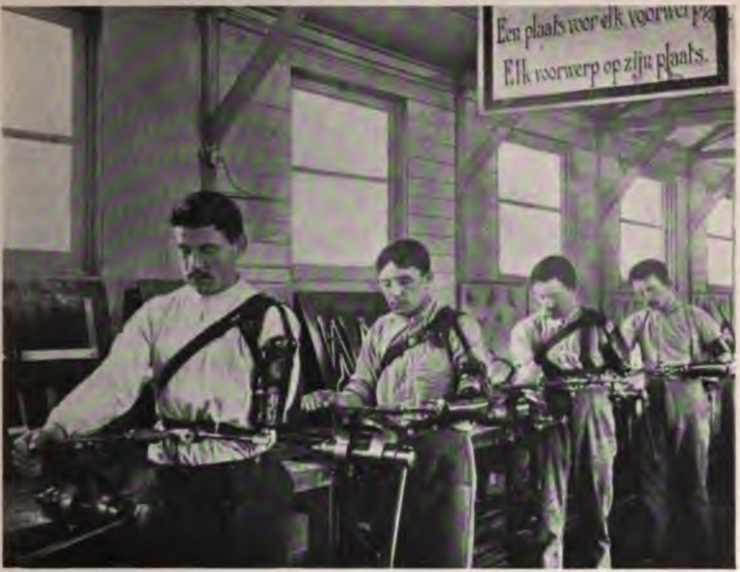
At Montpellier as at other schools, the question of finding situations for graduates is not a difficult one; the *mutilés* having a social value at the present time, especially in farming pursuits. The placement service of the school is not exclusively for its own pupils and is at the disposition of all *réformés*, right of preference being quite naturally reserved for its own graduates. This aid to *réformés* who are not members of the school is extended to them by mutual agreement with the Council of the Department Placement Committee which was created by the War Office and works in connection with the National Placement Service at Paris.[11]

Special mention should be made of the mechanical working appliances which have been made and designed at this centre, for maimed and amputated limbs. Most of them are adapted to farming occupations and rural industries. The appliances are similar to those described earlier in this report,[12] special grips having been designed to hold a variety of tools adjustable to two or three angles.

One hears frequently that Belgians are capable organizers and this is evident here at Montpellier, as well as at the Belgian Government Institute, Port-Villez (Eure). Both Monsieur and Madame Dronsart are as devoted to their French soldiers as they would be to their own countrymen and a visitor to the school could not fail to express the heartiest endorsement of their accomplishment during an enforced expatriation.

[11] See above, page 25.

[12] See above, page 33.


Een plaats voor elk voorwerp
Elk voorwerp op zijn plaats.

Machine shop at the Belgian school, Port-Villez

A wood turner, Montpellier school

MU

IV. Interpretations and Conclusions

THE WOUNDED MAN'S POINT OF VIEW

Let us recall what he has passed through by the time he reaches the hospital where people begin to talk to him of re-education and his future. He has fought on the battlefield and he has been wounded. He has been called from his home to defend his country; perhaps for three years he has endured untold hardships in the trenches, heat, cold, hunger, every discomfort mortal can think of. And then—he is wounded. He lies on the battlefield waiting for aid, or perhaps in deadly terror of being picked off by a German sharp-shooter. It may be hours before he receives even a first dressing. If it is his arm that has been hit, he stands a chance of reaching a *poste de secours*. If a leg, he may drag himself over the ground for hours, increasing his physical exhaustion through the instinct of self-preservation.

So much has been written, that the public must realize by now the horrors which these *mutilés* have suffered. Little wonder it is that they want rest—and only rest—to be let alone, when finally they have been put out of physical commission for active service.

To go back: from the dressing station the wounded man goes to a base hospital. If bones are smashed he stays there until his bed is needed for a fresh lot of wounded. At the base hospital he may be operated on. After this he is evacuated back to the interior of the country, sometimes passing through many hospitals. I know of one man who has been in twenty. At last he reaches a Centre of Physiotherapy and when he gets here his wounds are supposed to be healed. But he may still have to undergo surgical operations for the repair of joints or adhesions, or he may need electrical treatment, massage, mechanotherapy, and many other treatments which are tedious in process and discouraging because they are slow to show results perceptible to the man himself.

At this point, after all he has been through, future work often does not seem to him an immediate responsibility. He has *fought* for his country; he has become *crippled* for his country, and *now* his country should look after him. Why submit to a burdensome re-education when he knows that there are easy Government positions reserved for *mutilés*, positions to which he can look forward to with confidence? He little appreciates how many candidates there will be for those positions, and his ignorance gives him his false sense of security.

Necessary surgical reparation finished and while this wounded soldier is under treatment, curative vocational work begins. France is in advance of England here [13] because France has definitely recognized the importance of commencing training during this period of convalescence which lasts on the average from three to four months. Also because there are an insufficient number of centres to manufacture artificial limbs for the entire country, the weeks, months even, spent in waiting for these to be made are often tedious. It takes very careful study and adjustment to make suitable limbs for cripples. The time that is necessary to fit a limb, to test it out, and to wait for the stump to reach a condition of fair permanency as far as tissue shrinkage goes—all this makes it necessary for the *mutilé* to be under medical supervision for several months. During this period he must be taught how to use his apparatus. If a leg, how to walk and how to perform whatever work he is going to do with the least possible

---

[13] See Sir Arthur Griffith-Boscawen. Report on the Inter-Allied Conference or the study of professional re-education, and other questions of interest to oldiers and sailors disabled by the war.

A recreation hall

A dormitory

MU

hindrance from the fact that he is doing it with a wooden leg instead of his own.

This is, then, the psychological moment for encouraging the *mutilé* and turning his thoughts towards active industrial life after his discharge. If he is guided into a workshop and the right men tempt him to do something for the sake of the interest and occupation which it gives, the possibilities of engaging his interest seem almost unlimited. If he is forced into the shop under military discipline, the advantages may be lessened. There is absolutely no doubt that at this point, while still in the hospital, the crippled soldier must be 'reached' re-educationally. The surgeon, the artificial limb expert, and the trade-training teachers are all working on him at once. They are all needed and there should be no dividing line between their labors.

A disabled man may not understand why he should be put to work at once or why he ought to be re-educated, but nevertheless he is sure to find out sooner or later that idleness during these months of convalescence is disastrous and discouraging. This truth often emerges early in the convalescent's mind so that he is ready to welcome occupation, and especially occupation which is real work and which shows results. But in the manner in which trade work is carried on in connection with Orthopedic Centres, three or four months training may be sufficient to revive the appetite for work and yet be too short to start a man out to earn his living at an entirely different trade from that which he followed before the war. When discharged from a Centre of Physiotherapy his training in most cases is seriously incomplete. There are very few trades such that a three or four months' training is sufficient to finish and polish an apprentice so that he can go out and earn a livelihood.

Mutilés accept the shopwork which is annexed to Centres of Physiotherapy because they are under military orders. One told me the other day that if re-education could be offered to the disabled as something that they could accept *or* refuse, all would accept it. But he said "the spirit with which we accept it *under orders* is very different," very much more recalcitrant. Only a small per cent. of the *mutilés* continue and complete their training after being discharged from the army; this is the great problem today in relation to the disabled soldier. Then, too, most of those who voluntarily seek training after being *réformé* want *industrial* re-education. But this trend is an added disadvantage to France because she is primarily an agricultural nation. Eighty per cent. of *mutilés* ought now to be returning to the land because they are farmers and because France needs farmers.

When a man is discharged from the Army, he is free. Assuming that he cannot resume his old trade, three courses are open to him:

1. To seek vocational re-education (or to complete it if begun while in a hospital).
2. To seek immediate employment without training.
3. To loaf and wait for the *petite place* or government sinecure.

The second course is a serious mistake; the third is still worse. Suppose he takes the first course and applies to one of the re-educational schools; the important question then is, in what trade shall he be re-educated? Vocational guidance or the choice of a trade is a most difficult matter and one for most careful judgment. Four factors enter in: (1) the man's physical disability and the limitations created by it; (2) his former occupational experience and his natural aptitude or taste for a given kind of work; (3) the favorable or ominous conditions in the industry which he may seem to be especially fitted for; (4) his social environment and economic needs. Among those who might guide an adult who has had a crippling disability thrust upon him, no one is fit to make the final decision except the man himself.

At the Inter-allied Conference held at Paris in the month of May, 1917, it was agreed that committees attempting to guide these men should follow a certain procedure: First and most important, that these committees should be composed of experts from the medical, technical, industrial, and social fields, and that before advising any *mutilé* to taking up an entirely new vocation, they should urge him to return to his former occupation and, if this is not possible, to enter an allied occupation in which previous experience would be an asset. But however carefully such rules as these are considered and mapped out, it is another matter to put them into practice. When this stage is reached the present tendency in France is to have the physician in charge of the military hospital act in the capacity of counsellor to the men entering the workshops. But in practice even this degree of guidance is too often a mere matter of form. Men are assigned to a trade on a basis of their physical disability and with little consideration for the other factors which govern the success of their industrial future.

Doctors seem to feel that they are the last 'court of appeal' as to what a man is fitted for, because they are the ones to decide on his physical condition and risks. In his report to the British Government, Lord Charnwood, referring to the recent discussion of this problem of choosing an occupation, said: "There was a marked tendency to speak of the disabled man as if some ideal combination of expert authorities was going to settle for him, over his head, what he was going to do." In England the decision rests entirely with the man.

In a few French schools, committees of guidance do exist, but after talking with the Directors, I am inclined to doubt whether many of these committees actually make their decisions after a full and thoughtful consideration of the facts. Yet from the point of view of the *mutilé* they must do just this, on pain of failing to place him successfully if they do not. In this question of guidance, the experts in the various fields may be represented on the steering committee; yet unless the *mutilé* can express his own needs fluently, the missing member of the committee, to my mind, is the social worker who would represent the knowledge of his family, his home conditions, his tastes, and ambitions. Yet even this is not enough. With the most careful provision for giving him expert guidance, the decision should finally rest with the disabled man himself.

Following the progress, the sufferings and perplexities of the *mutilé* after his discharge from the Army, the next step brings us to the completion of his training if already started in a Military Centre. This completion he can get in a civil centre of vocational re-education which ought to give him scientific training under experienced practical teachers and in well-equipped workshops such as would be found in industry. But in fact the *mutilé* is confronted in the French schools with the tendency to organize training in small trades as cobbling, basket-making, harness-repairing, etc. Hence, at this juncture, investigation would soon show any *mutilé* of an inquiring turn of mind that men are being turned out with just enough experience to earn a living in rural communities where competition is not great. The *mutilé* will find, as I have found, that except in a few schools little study has been devoted to the future industrial needs of the country, especially with reference to industries formerly monopolized by Germany.

There are as I have said a few exceptions. For instance, the watch-making, fine instrument forging, and electrical work. A few other schools have small branches of electrical work. There is one good fur workshop which is sending trained men into industry. Wireless telegraphy as taught at Lyon is another example of good industrial foresight on the part of those looking ahead for the crippled man. Almost no effort has been made to increase the productive power of cripples through an extensive use of machinery. This oversight is all the more serious when we consider the fact that fewer men, and a large per cent. of crippled men at that, have got to carry on the industries of France after the war shall end and with the added handicap of a lack of scientific training in new fields.

If the *mutilé* happens to be treated at Paris he will discover that some of the trade unions are training cripples under trade union supervision. He will receive conflicting estimates as to the actual value of this training. He will find that almost no use is made of technical schools in this trade union plan, though it also has to be granted that relatively few of such schools existed before the war. England is far in advance in this field of training and can therefore offer it to her disabled men, ready made.

SYSTEMS OF TRAINING

With few exceptions the 'boarding-in' system enjoys almost universal vogue in France. This plan may suit the needs of the French *mutilé;* Directors of French schools say that no other system would be successful here. But certainly such a plan could not be successfully applied either in England or in America. To take young or middle-aged men and subject them to the discipline which this system implies, curtails their liberty to an extent that would never be popular in our country. The Frenchman seems to accept the 'boarding-in' system as a matter of course, in case he accepts re-education at all. I grant that there are advantages in this system of all-day special training in schools organized and equipped exclusively for *mutilés*. Training can then be adapted to their particular needs. Moreover, unnecessary and repetitious labor, such as an employer would insist upon, is eliminated. Practical and theoretical work can be carried on exclusively to the pupil's advantage. Thus in perhaps half the time in which apprenticeship in a workshop would ordinarily require, a man can be given the essentials of a trade. Armed with these essentials he can continue his apprenticeship in industry at the same time that he is earning his maintenance.

The 'placing-out' system under which men are apprenticed to employers in local workshops is a wholly different matter. There are advantages and disadvantages in it when compared to the 'boarding-in' system. It requires careful supervision of men's free hours and also tactful watchfulness over such shop instruction as they are given, because it is generally felt that employers often make use of the labor which a *mutilé* can give without feeling much responsibility toward the guiding of his training. I have reason to believe that the system is being successfully carried on at Tours, yet I recognize that because supervision of a man placed in industry is one of the most difficult things to accomplish successfully, this system may never be as extensively used as the boarding or day school plans. A good placement agent is an extremely hard person to find.

When men come from a distance for training at a re-educational centre, and when, nevertheless, the boarding system is not considered wise, a compromise is attempted by arranging a special boarding house for the men where, with a suitable social worker, man or woman, the free time of the men can be filled and a certain moral supervision carried out. By this plan the *mutilé* enjoys his liberty and feels the advantage of being able to go to work each day. He knows that he is working under normal industrial conditions in competition with able-bodied men; hence he lives a moral normal life than when segregated.

But after all, the success of either system depends entirely on the selection of the Director. Nothing makes so much difference to the *mutilé* entering a re-educational school as the personality and previous experience of the Director. He feels this reflected in the general spirit of his fellow workmen, their application to work, their keenness, their happiness, and in the length of time that they are willing to remain under training when this is voluntary. In one French school which I visited some of the men stay as long as a year and a half and can really perfect their skill in a chosen trade. In other schools the Directors themselves confess that the men are eager to leave as soon as possible; they cannot be held longer than an average of six to eight months. In fact some of the schools are giving up their tailoring workshops because tailoring apprenticeship means at least twelve months and they cannot get the men to stay so long. At Montpellier there is a large and thriving tailor's shop where many of the cripples remain for over a year. The object of the school is to make the course as perfect as possible, not necessarily as short as possible.

The choice of workshop instructors also depends upon the Director. Their influence over the men, whether kindly and sympathetic or unreasonably disciplinarian in character is likely to be a reflection of the Director's attitude as well. Where shall *contre-maîtres* be sought? Shall they be drawn from the technical schools, the trades unions, from amongst competent workmen in industry or from the ranks of the *mutilés* themselves? Differences of opinion exist as to the value of selection from each of these resources named, but an answer to the situation in France today is that each Director seeks wherever he can find him, the man who is capable of training and interesting *mutilés* in a new vocation. Men who have had no experience in teaching whatever are often successful in passing on the essentials of their trades to others. Trades unions have supplied masters of skilled crafts, who being also wounded are thrown back from the fighting lines to share in reconstruction work. Many schools are combining theoretical instruction and practical shopwork and have secured pedagogical instructors who plan their courses with the *contre-maîtres* of the *ateliers*, thus combining the experience of both.

In the centres where the men seem to be the most contented one almost always finds that something is done for their social life and recreation. Practically all centres have a barrack for amusement, but most of them *are barracks* and nothing more. In at least five centres regular lectures and entertainments, not spasmodic affairs, are provided for the men.

It is not surprising if, after nearly four years of war and after months of military discipline, the *mutilés* do not want to remain as boarders in a re-educational institution. This creates a dilemma. The best solution that I can see is this. Granting that institutions are necessary, let us make them homelike. Let us divide men into small groups as far as possible. Small buildings with comfortable rooms for writing, reading, and recreation will accomplish something because they split up the large groups of men who have nothing to do but to sit around and smoke in their evenings. Anything, to get away from sparsely furnished barracks such as they have lived in while in the service. Plenty of social workers can be well occupied in making the barracks more homelike, in planning recreation and friendly human intercourse for the men, and in looking after their families. To insure profitable results in training, a man must not have cause to worry over conditions of hardship which his family may be enduring in his absence. Whatever aid is needed must be supplied to them else we shall fail to hold the men and to help them to throw themselves unreservedly into the task of rebuilding that which war has destroyed for them. The whole problem is, as Professor Fuster has well said, one of re-adaptation, of social reconstruction work, and here as elsewhere the welfare of the man is dependent on that of his family; both must be provided for.

CONCLUSIONS

The experience of the French and English Governments show that no thorough plan for continuous re-education for the disabled soldier has yet been satisfactorily worked out. In neither country has one central authority determined on standard methods by which the crippled soldier shall be properly trained and returned to civil life to earn a livelihood. Nor has authority been asserted to insure the coordination of existing effort on his behalf. In France the system works out haphazard. Good methods and programmes of coordination have been planned but have not been put into practice by the government.

No government has accepted the problem of re-education in its entirety, *i.e.*, beginning of training while the *mutilé* is still under treatment and continuation after discharge from orthopedic centres. In England the War Office has not accepted the responsibility of utilizing the period of convalescence as a time in which to start thorough training with a hope to remake habits of industry and to stimulate ambition toward future continuation of training. This is a weak point in their system because chances for the future are completely lost through the deteriorating influences of this period, as well as because the fact that a man is discharged from the army with no definite work object in view. In France, vocational training is begun while the man is still under medical and surgical treatment.

But these orthopedic centres provide for less than 25% of the total number of the maimed.

Once discharged from the army, the *mutilés* taken as a whole prefer not to be re-educated. There have not been worked out standards for training which can be applied in re-educational schools, and plans for supervision and coordination of work of different enterprises have been admittedly a failure. To handle the *mutilés* there is no central authoritative or guiding body such as the Government attempted to institute when the National Office for *mutilés* and *réformés* was created, but which has not been able to carry out its program for coordination of effort.

For our nation which soon will face the job of guiding large numbers of disabled soldiers back into civil life and in a way that their return may find them equipped to compete with the able-bodied, a lesson may be learned from the four years' experience of these two countries.

Granted that the maimed soldier should and must be returned to ordinary community life to live, to work, and resume his share in it; granted that he should re-enter industry on a basis of competition with able-bodied workmen, how can this be accomplished? If he cannot continue his former vocation, the one answer is *training*. By the very best training that can be secured he may become skilled in some new trade or line of industry by which, in spite of his physical handicap, he can measure up to a degree of competency equal to that of other workmen. Contrary to what may be the popular conception, cripples who have lost an arm or a leg and who at first sight may seem hopelessly disabled, can be taught many of the numerous processes of industry such as running a lathe, operating a motor tractor, or controlling a drill and other skilled operations for which mechanical aids can be adjusted to serve the workmen in place of the one he has lost. It is not difficult for a man who has a leg amputation to learn many of the various trades which require only the use of his hands. The range of choice for those crippled in this way is great. Perhaps the occupations which offer the greatest appeal are industrial drafting and design; the making of surgical instruments, tools of precision and small electrical parts; watch-making; telegraphy; photography; printing; and others. A glance at trade training for crippled soldiers as offered in English schools will serve as a guide to the actual possibilities open to the disabled.[14]

Properly trained and skilled workmen, even though disabled, should be accepted without discrimination on the part of trades unions and employers. Disabled men who are unable to measure up to an average degree of skill or physical capacity for competition in large industries can be trained in small trades which, when followed to the extent of their strength and ability, will enable them to earn a wage sufficient for maintenance when taken in conjunction with their pensions.

How to organize and accomplish this re-education is the problem facing each nation at war today. More often than not, the disabled soldier does not recognize any need for retraining, especially at the time when it is most important for beginnings toward this re-education to be made. A nation whose soldiers have become crippled in its service owes them the duty of returning them to civil life, medically and surgically cured as far as possible, and industrially competent to resume their places as self-supporting individuals. But it may not be consistent with our American ideals of personal liberty to insist that a man be re-educated if he does not personally desire it. Yet there are precedents for imposing education when without it a given class of people may become a problem for national concern.

---

[14] *Recalled to Life.* John Bale, Sons & Danielsson, Ltd. Oxford House, London.

Whether such a problem will ever face the United States depends on the number of crippled men who may be returned from the war. But I believe that rightly organized and rightly directed, the opportunities for re-education can be presented to the crippled so that they will accept them eagerly. The Government should at least decide to consider its crippled soldiers as still under care of the War Office until they have been physically repaired to the extent which science can assure. This includes not only surgical repairing, functional re-adaptation, but also the providing of artificial limbs and prosthetic apparatus. It also means physical re-education in the use of these substitute members. During this time and in the same centre, vocational re-education should begin.

In most cases vocational work acts as a therapeutic agent and indeed exercises muscles and joints in a way which mechanical therapy does not succeed in accomplishing. Both England and France, though this is not openly acknowledged in the British War Office, appreciate that this is the time to point the way for future industrial opportunity by offering vocational training. They know that at this time one can reform habits of work, reclaim character, and stimulate ambition.

Referring to the British system, Sir Charles Nicholson, member of the Pensions Office says:

> It will be remembered that a serious effort was made in this country in the same direction so that the soldier should not be discharged until it was clear that everything that medical and surgical skill could do for him to fit him for civil life had been done. The War Office, however, took a different view, and urged that they were only concerned with keeping able-bodied soldiers in the firing line and also that if this further duty was placed upon them the machine would break down. Personally, I think that the War Office was wrong in taking this line, but it must not be lost sight of that in France the soldier is treated much more like a child than in England.

The various specialists working on the man's treatment at this period must each contribute to carry out a continuous program. The doctor keeps watch over the strain and fatigue imposed by various operations required in the vocational work selected, and by this opportunity for observation of cause and effect between treatment and work he can judge the suitability of chosen work from a medical standpoint. The artificial limb expert is guided in his adaptation of one of many type of limbs to the individual. Adjustments and fittings can be made with due consideration for the physical demands and strain imposed by the nature of the occupation.

The condition of the stump of an amputated limb is of such great importance in fitting an artificial limb that several months sometimes pass before satisfactory results are obtained. During these precious months when a man is waiting for treatment, he will not regard his training, introduced at this time, as a compulsory or burdensome affair. He should be guided into a trade in which, when discharged from the army, he will be helped to find adequate opportunities for continuing. That much depends upon the man's interest being aroused during this period is evident, and for this reason teachers should be selected with special reference to their personal influence as well as their technical experience. Once trained the same supervision should continue for a certain time after the *mutilé* is placed in industry. Allowances to his family ought to continue as long as he is receiving re-education, and as an added encouragement he can be awarded bonuses which will give a reasonable wage for support until such time as he becomes a thoroughly skilled workman and can earn a standard wage.

V. Program of the American Red Cross in France

As a result of the above studies and the facts set forth, it has seemed as if the American Red Cross could be of use in supplementing the work of the French schools. For this assistance the Bureau for Re-education of Mutilés has developed plans for three definite lines of action, as follows:

I. The establishment of an agricultural training station for French *mutilés* in affiliation with a centre of physical therapeutics. Owing to war conditions and the consequent lack of labor obtainable, many excellent farms have remained uncultivated for a considerable period of time. The owner of an exceptionally well-equipped farm of 500 acres has placed this at the disposal of the Red Cross for its re-educational work with the disabled.

Situated in the Touraine, one of the most fertile areas in France, the estate lends itself to our project from many points of view. Scenically and historically, the location is one to challenge the imagination; it almost touches the bank of the river Cher and is in near proximity to Amboise and Chenonceaux, where in the castles bearing these names, Mary Queen of Scots, Francis II, Catherine de Medici, and countless others lived and made history for France. Practical farming, scientifically developed, will have its poetic surroundings here, and when the driver of a twentieth century *camion* shall transport farm produce raised by our war *mutilés* to the nearest railway station, he will cross a bridge where, down the stream a bit and in full view, the Castle of Chenonceaux spans the channel of the Cher, and which, with its towers and drawbridges, has survived other wars but seems far removed in spirit from the present one and its human wreckage.

For a French farm, this 500 acres of land represents a fairly unusual opportunity to carry on extensive cultivation by use of motor machines, such as the Red Cross plans to do. A model dairy will be one of the first and most important industries to be established, and for the special direction of this section, as well as in the capacity of the Farm Comptroller, we are fortunate in having the Professor of Animal Husbandry from one of the largest Western Agricultural Colleges crossing the ocean farmwards at the present time.

A French *Chef de Service de Rééducation*, with an entirely French personnel to assist him, will train the *mutilé* farmer in scientific methods for producing crops, stock raising, and poultry work, a task already proved difficult in times past with the farmers of our own country who were in their turn skeptical of methods other than those handed down by their grandfathers. Supplementary to labor in the fields and stock-raising, there will be workshops for teaching allied farming industries such as basket-making, harness-repairing, carpentry, and machine work.

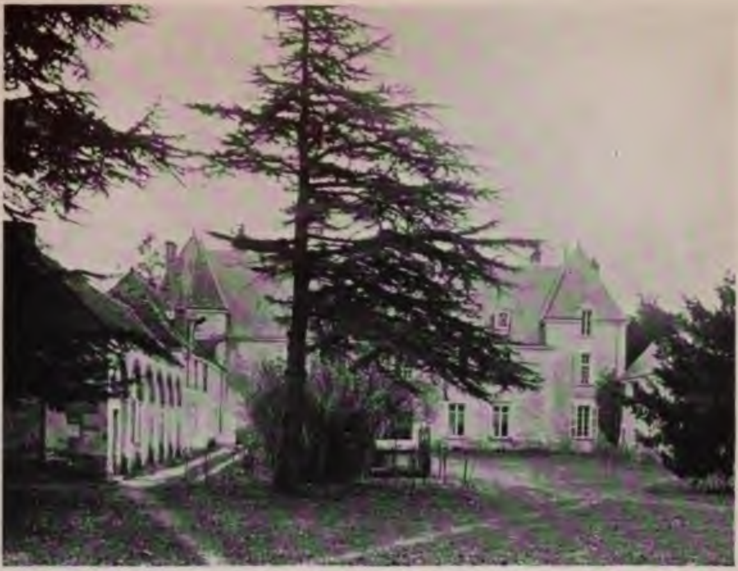
On the left of the driveway leading to the Château, a lodge formerly occupied by the gamekeeper, is to be reserved for a small group of blind soldiers who will be instructed in poultry work. The success of this industry as taught to the blind at St. Dunstan's, near London, is responsible for its inclusion in the plans for the Red Cross Centre.

It only remains to add that a social worker who has had successful experience with French *mutilés* is engaged and ready to assume her duties and pleasures in ministering to the comforts of the men and establishing relations with their families.

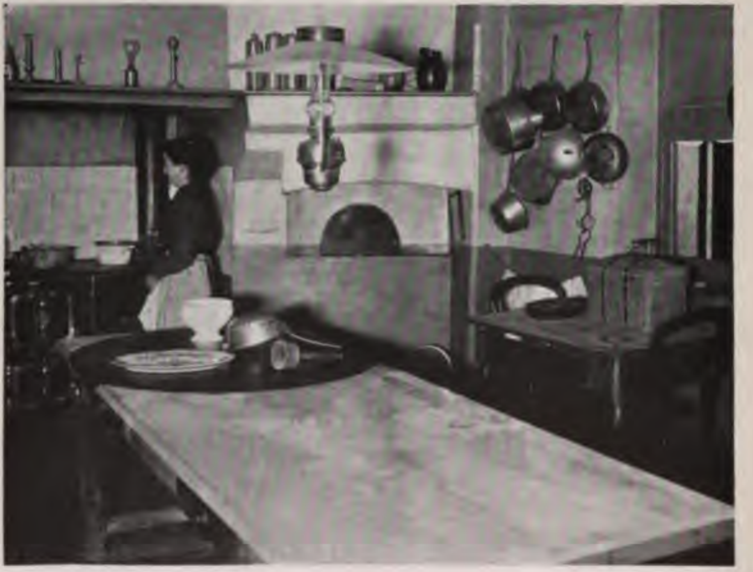
The farm buildings as seen from the Château

Cowsheds and stables

THE AMERICAN RED CROSS AGRICULTURAL CENTER
NEAR CHENONCEAUX



The Château



And the kitchen

THE AMERICAN RED CROSS AGRICULTURAL CENTER
NEAR CHENONCEAUX

II. The installation of a model electrical training workshop as an annex to the National Vocational Institute for War Cripples at Saint Maurice.

Because in peace times this Institute is an industrial training centre for work accident cripples, the gift of this equipment will have a permanent value after the war shall end. Barracks for housing and training fifty men are in process of erection and machinery has been ordered. Much of the necessary equipment has been donated through the efforts of Dr. Maurice Bourrillon, Director of the Institute, who is organizing this new department.

III. Educational propaganda which will reach and stimulate the *mutilés* in hospitals and decrease the number of those who are indifferent to any plan for their vocational re-education or who are opposed to it. This will be effected in two ways: (1) Moving pictures illustrating the re-educational work of various schools will be shown in hospitals and explained by a lecturer in charge. Amusement films will be included. (2) Lecture and entertainment tours which will circulate in turn amongst the vocational re-educational centres. For practical purposes in carrying out these plans, France has been divided into four geographical sections and the cooperation of Directors of local schools has been secured to aid in organization and recruitment of lecturing and entertainment personnel.

IV. In outlining the scope of our efforts many of which are only partly under way, it is necessary to add that assistance is likewise being given to existing schools. This is financial or material (supplies and equipment), according to the special needs.

These projects are we hope of value in France today, owing to conditions existing here and now. For America, they may well have special importance later on.

Appendix I

RECENT LEGISLATION

January 3, 1918, a law was passed by which every cripple may demand admission to a re-educational school, but is placed under no obligation to do so.[15]

A second article of the law legalizes the *Office National des Mutilés de la Guerre* which was created by a Ministerial Decree, March, 1916. This was a war measure, and by the present law becomes a public establishment to be operated under the Ministry of Labor. Its duties are the same as outlined above.[16]

---

[15] *Journal Officiel*, January 3, 1918.

[16] See above, page 16.

GENERAL LIBRARY
– 2 1918
UNIV. OF MICH.

Publications of the Red Cross Institute for
Crippled and Disabled Men

Edited by Douglas C. McMurtrie

Series 2 July 10, 1918 Number 2

Principles of Design and Construction of Artificial Legs

by

Captain Philip Wilson, U.S.R.

Bureau of Artificial Limbs
American Red Cross, Paris

The Red Cross Institute for Crippled and Disabled Men
311 Fourth Avenue New York City

Principles of Design and Construction of Artificial Legs

Principles of Design and Construction of Artificial Legs

Artificial legs have existed for centuries under the form of peg legs or *pilons*. They were known to Pericles and were used by the Romans and even earlier by the Egyptians, who invented a primitive form of wooden support for amputations of the thigh. In modern Europe the peg leg became a familiar sight after Napoleon's campaigns. It existed in two forms, depending upon whether the amputation was above or below the knee. In the former case the apparatus consisted of a hollow wooden cone, usually lined with leather, inside which the stump rested, the upper edge being hollowed out behind to fit the ischium upon which the weight was borne. A simple wooden peg with rubber tip transmitted the weight to the ground, and simple suspenders crossing over the shoulder on the unamputated side completed the apparatus. For amputations below the knee the stump was flexed and the weight borne upon the bent knee. Both of these forms of apparatus were strong, light, and simple, and rendered good service. They have both persisted to the present day as the resource of the poor or of those doing hard manual work. The principles of support in cases of thigh amputation were practically the same as those used today in the fitting of our more complicated artificial limbs.

The first regular artificial leg of which I have been able to find record was invented by the Comte de Beaufort in 1853. This is an intermediary form between the peg leg and the later French models of the so-called 'orthopedic' type. It is composed of two side supports, or pairs of supports, for they are articulated at the knee, which are made of wood turned to conform to the shape of the leg and the thigh. At the top a collar of sheet steel in the form of a semicircle connects the vertical pieces at the rear and is shaped to hold the ischium. The stump is further supported by a leather corset riveted to the uprights and laced in front. A wooden foot with a simple ankle articulation and with springs to hold the foot at right angle to the leg is fastened at the lower end of the uprights. The calf is made of leather to resemble the calf of the natural leg. This model is not intended to be used with flexion of the knee, and a lock is provided to secure rigidity in walking. Only in the sitting position is the lock released to permit flexion of the knee. The Beaufort model was still being used at the beginning of the war in 1914.

In 1857, a Frenchman named Xavier made an artificial leg of wood, somewhat similar in appearance to the wooden legs of the American type in use today. The model of this leg is still on exhibition in the museum of the Val-de-Grâce. A few years later, another leg of similar type was constructed by Charrière, but after that construction in wood seems to have been lost from view in France.

The Civil War in America gave an impetus to American inventiveness, and, apparently quite independent of the work that had been done in France, artificial legs were constructed of wood in 1867 by Palmer, Douglas, and Marcks in the United States. A few years' experience there showed that with use the wood had a tendency to crack and split. To overcome this difficulty Marcks introduced the practice of covering and reinforcing the wood with rawhide stretched and applied when wet. This permitted the lightening and strengthening of the apparatus at one and the same time, and was an improvement of capital importance. Except for improvements in the mechanism of the articulations the American apparatus has shown very little change since this time.

During the years before the present war the invention and manufacture of artificial limbs had no scientific basis. Progress was made as the result of commercial competition only. The surgeon did his work independently, without attention to what kind of stump would most readily lend itself to the easy attachment of prosthetic apparatus or give the best result from the standpoint of efficiency. Once the stump was healed and the patient able to do without dressings, the surgeons' work was finished, and the patient was left to shift for himself in securing the best apparatus. Almost immediately he began to be flooded with literature from the manufacturers of artificial limbs. He read in letter after letter that he could be made to look upon the loss of his limb as a positive relief, so cleverly had man improved upon Nature. Finally, with his brain confused by conflicting claims for the different models, he placed an order and obtained a limb which was the same whether he was a laborer or a professional man. The only interest of the limb maker was to induce him to buy the most expensive model that he could afford. With the important question of price settled, the limb was fitted as best it could be to his stump. The progress that was made in the manufacture of artificial limbs in spite of this state of affairs affords a potent example of the value of commercial competition as a stimulus to invention.

In Europe during the fifty years preceding the war the number of amputations was small. The demand for artificial limbs was, therefore, not large enough to justify a separate industry devoted entirely to the business of supplying them. In France there was a large and thriving industry concerned with making and fitting all kinds of orthopedic appliances—corsets, braces, trusses, etc. The men engaged in this business were required to serve a rigorous apprenticeship or to take a certain amount of training at a special school maintained for that purpose at

Paris and receiving an endowment from the state. These men were members of a union which insisted that all new members comply with the requirements. When a patient required something in the way of apparatus his doctor sent him to the "orthopedist," as a manufacturer of these articles was called. It was therefore altogether natural that the surgeon should also send his amputation cases to the orthopedist for the artificial limbs needed. It was also natural that the latter, accustomed to make the larger part of his apparatus out of leather with steel support, should look for the solution of the limb problem in the same material. The Beaufort leg served as his model. He knew nothing about wood working and passed this material over without much consideration.

On the other hand, in the United States, where industrial conditions caused many accidents, amputations of the leg were frequent and the demand for artificial limbs was large. There was, moreover, no recognized business dealing with similar articles which was prepared to respond to this demand. For these reasons a special industry grew up which devoted itself exclusively to making artificial limbs. For the most part the business has been in the hands of a few families, the original pioneers in the field passing their trade secrets down to their sons, but about 1890 the business expanded largely, owing chiefly to the facts that a large number of the original patents had expired and that the business was generally reported to be a profitable one.

Such, then, was the status of the industry at the outbreak of the European war. In Europe, where the business was in the hands of a quasi-medical group, the limbs produced were of a different type from the American limb and much inferior to it. The characteristic of the business everywhere was the lack of scientific basis. Nowhere could a doctor be found with sufficient knowledge to make improvements, and there were few, indeed, who even knew what an artificial limb looked like. Literature dealing with the subject was non-existent.

The outbreak of the European war with its tremendous casualties brought a complete change. The various countries provided funds to supply their *mutilés* with needed apparatus. It was necessary to see that this money was well invested. As the doctor in charge of the *mutilés* was the person best fitted for judging the value of apparatus, the matter was placed in the hands of orthopedic surgeons. The men appointed by the French government to take up this matter immediately began to study the subject, but for the first year or two left the manufacture of apparatus almost entirely in private hands.

In England, even before the war, there were a few makers of the American type of leg. English soldiers who suffered an amputation were, therefore, provided almost from the start with artificial limbs made of wood. In France the orthopedists brought forward the French type of apparatus and a year or two was necessary to bring the doctors to the point where they realized its many defects. Then when they discovered the superior merit of the American leg, they were confronted by the fact that the only companies able to manufacture it were foreign ones. At this time the great problem of the *mutilé* was beginning to be understood, and the conception that it could be solved by re-education was spreading rapidly through the country. The development of a new industry for making and repairing artificial limbs of wood offered good possibilities of employment to disabled men. The re-education of war cripples was, therefore, made use of to create a supply of skilled workmen for this trade. The physicians-in-chief of the orthopedic centers, whose duty it is to determine what apparatus shall be supplied and to inspect it when completed by the manufacturer, are practically unanimous in their preference for the American type of artificial limb. Even yet, however, at many French centers, the French type of apparatus is still being given out.

In introducing the American leg, the orthopedic surgeons have had two great difficulties to overcome. The first was the prejudice of the French manufacturers, expressed through a powerful syndicate, who saw the possibility of a lucrative part of their work passing into other hands. This situation has been remedied to a large extent by the manufacturers' final acceptance of the situation and their decision to manufacture these limbs themselves. The second was the difficulty of securing production on a large enough scale to supply all needs. The French tradition of skilled hand labor and French repugnance to machine methods were obstacles to quantity production. There was also the difficulty in securing seasoned timber. As a matter of fact, on account of the scarcity of willow the French manufacturers have had to experiment with and find another kind of wood to be used as a substitute. Great credit is, therefore, due the medical men who, in the face of such difficulties, have accomplished so much.

THE MODERN CONCEPTION OF PROSTHESIS

Prosthesis meant formerly the substitution of artificial apparatus for a missing limb, but its modern conception is much larger in scope. According to the present idea, it might better be defined as the system of treatment which will restore a man who has suffered an amputation to the greatest functional efficiency.

This difference between the old and the modern conception of prosthesis is of capital importance. You may give an expensive artificial limb to a man and feel that you have done a good work, but if you know that that particular man happens to be an agricultural worker, and that he is returning to work on his farm in some remote corner of the country, miles distant from any place where he can obtain repairs to the complex mechanism of his limb, and if you realize that he is going to use his limb in rain or shine, on hard stone roads, or in freshly plowed fields where mud will inevitably work into the joints, you are likely to feel some misgivings. Your misgivings would become positive self-reproach if you happened to pass that way two or three months later, and met the same man walking up the road on a crude peg leg that he had manufactured himself, or with no leg at all, but only a pair of crutches. In other cases you may be called upon to fit an artificial limb to a stump which on account of some particular stiffness or muscular contraction is bent at such an angle that it can never be properly fitted. It may happen that you meet cases of that sort continually; yet you know that they are all due to certain practices or lack of practices on the part of the doctor last charged with the treatment of the case. If a simple explanation is all that is necessary to secure better results, that explanation should surely be given. Again you may be studying a particularly difficult case and wondering how on earth it will ever be possible to make the man useful again, his limb having been amputated either too high or too low. You may even learn that this particular level was selected because the surgeon thought that a stump of that length would lend itself more readily to the use of an artificial limb. Would you be discharging your responsibility then, if you kept silent?

Prosthesis, in its legitimate desire to secure the maximum efficiency from an amputation stump, is concerned with everything that is going to have any influence upon this result. It, therefore, is concerned first of all with the amputation itself, with giving the surgeon the knowledge of what the fitter of an artificial limb requires of a stump, so that the combined efforts of surgeon and fitter may obtain better results than they have been able to obtain in the past working separately. Following the amputation, prosthesis is concerned with the after-treatment in order to prevent all complications or deformities that will tend to decrease functional efficiency. It is concerned with all apparatus which in any way will hasten the completion of the period of treatment. It is concerned with research into the functions that must be replaced so it may provide the most efficient substitutes. It is concerned with the profession that the maimed man is going to follow in order that he may have the apparatus which will best serve his needs. It is concerned with the perfection and invention of forms of apparatus which may render better service than the old, and their proper fitting. In short, it cannot be indifferent to anything that will have a bearing upon the future usefulness of the maimed.

It is important that this new conception be thoroughly understood, because only by turning it into practice can the condition of the maimed be improved. It is one of the great changes that the war has brought. In the past, prosthesis has been a department by itself, and a field for profit and quackery. It was important, to be sure, from the individual's point of view, but it was unrelated to his previous treatment, and had no special connection with what he was to do afterward. Now prosthesis is considered a part of medicine, a variety of treatment which should be in perfect continuity with other treatment from the moment of injury to the time of discharge. The maimed man now is not held to be cured when his wounds are healed, but only many months later, when he has been taught a new life work adapted to his ability and when he has finally been assured of the maximum return from his injured limb.

STUMP CHANGES FOLLOWING AMPUTATION

The chief change that takes place in a stump following amputation is atrophy. This appears very quickly even in the uncut muscles, and is coincident with the period of disuse and confinement to bed. It disappears when the limb is used again. Certain large muscle groups, however, have definitely lost their usefulness by being cut loose from their connections. The fibers of these muscles grow smaller and develop attachments to the bone. This change is accomplished at the expense of the length of the muscle fiber, and extends considerably above the line of the amputation. These muscles, also, lose in contractility. There is still another group of muscles which, on account of section at a higher level and interference with nerve supply, degenerate completely and are replaced by fibrous and fatty tissue.

A later change is bone atrophy, which may be detected in a radiograph by the relatively less dense shadow thrown by the injured bone compared with a normal bone.

Another change is the retraction of the skin and soft parts. This is to a certain extent dependent upon the amount and extent of the scar tissue. At first the soft parts are held to their position by being fastened to the scar. As absorption of the scar takes place, first the skin and then the superficial muscle groups retract upward. This leads to diminution in the size of the stump and also to the complete disappearance of long flaps. Even those cases where the tissues at the end of the stump were redundant cannot be distinguished from those with shorter flaps. In cases where the covering of the bones is insufficient, there will almost always be protrusion of the bone beneath the skin. With the use of the stump hypertrophy of the intact muscle groups which actuate the bony lever takes place. This may be encouraged by exercises, but it will never take place to any large extent until the stump is actually being used for purposes of support and locomotion, that is, until it is equipped with some form of apparatus which makes walking possible. The longer this use of the muscles is postponed, the more difficult it will be to develop them. Yet because the length of the bony lever which they operate has been reduced, it is most important that they make up in power for the mechanical disadvantage at which they work.

With the wearing of an artificial limb another type of atrophy is added to that which has already taken place—the pressure atrophy that comes from the transmission of the body weight through the soft parts of the stump to the socket of the apparatus, which in turn transmits it to the ground. This atrophy, unlike the first, is helpful rather than destructive. It consists almost altogether in the getting rid of the large amount of fat that has been deposited in the stump as a result of disuse. The fibrous and muscular structures become firm and more compact, and the skin increases in thickness. Muscular atrophy is very little evident at this stage, due to the fact that it has already taken place. The change in the size of the stump due to pressure atrophy is sometimes very great.

Thus we see that in form and size a stump for a long time following the amputation is in a plastic state. The changes of the first period require a period of five to seven months. The changes of the second period only occur to any extent after the fitting and wearing of the apparatus. They require about the same period, with constant pressure on the stump from a well-adjusted socket. Although these changes are due to two different causes, there is no reason why they should not be made to take place synchronously.

Depending upon the types of amputations and their level, these changes take place in varying degrees. Thus, in disarticulation of the hip, the atrophy is most evident in the gluteal muscles. In amputations of the upper third of the thigh there often appears to be very little change. This is due to the fact that almost all the muscle groups have been sectioned, and only those remain active which are attached to the hip joint. The cut muscles retract almost immediately after the amputation. The process occurs quickly instead of during a long period. The result is that the later changes are very little evident. When an apparatus is applied, the socket has very little purchase upon the soft parts. This type of stump is characterized by its extreme elasticity; it is tough and springy to a degree. Amputation of the middle third of the femur gives a stump in which the atrophy is chiefly noticed at the end. The stump finally becomes conical in shape, with sharp inclination from a wide base. In amputations of the lower third of the femur, atrophy is quite extensive, and one gets a long, narrow, conical stump; or, depending upon how near the condyles the bone is sectioned, one may actually have a widening of the end with a production of a bell-clapper stump. About the condyles the covering of the bone is extremely thin.

In amputations of the lower leg in its upper half, considerable atrophy takes place, chiefly on the inner and posterior sides. This produces an apparent change in the form of the tibia, the bone seeming to curve outward, but the change is purely an illusion due to the fact that the soft parts conform to the bony shape very closely on the inner side and reveal the sharp flare as the tibia narrows from the head down to the shaft. The head of the fibula is often prominent also. From the upper third down the stump becomes almost straight and quite narrow. The calf disappears almost altogether. In amputations of the lower half the circumference of the stump is practically the same and also the shape throughout its lower two-thirds.

In Syme's and Pirogoff's amputations the stump is the same as the preceding, except that it widens at the end conforming to the outline of the malleoli and produces the bell-clapper appearance. In amputations through the tarsus, very little atrophy of the stump occurs.

Another change which commonly occurs in stumps is change in sensibility. Almost every one is familiar with the hallucination which persists in regard to the missing limb. However, this does not necessarily persist always. The work of Professor Amar, director of the Laboratory of Physiology at the National Conservatory of Arts and Trades, Paris, has shown that the sensibility of the stump is reduced. The end of the stump is but little sensitive to the touch. Examination with two ivory points (the æsthesiometer of Weber) gives a result for the threshold of perception of twenty millimeters between the points. Hypoæsthesia is more pronounced upon the lateral surface of the stump than upon the scar.

Another noticeable feature is that of lateral projection. If one touches a point upon the transverse surface, the sensation is felt upon the lateral surface some distance from the point touched. This distance varies according to the recency of the amputation and the amount of atrophy of the stump, being greater in recent cases. By education and especially by return to work the sensibility becomes normal. The Weir-Mitchell phenomenon is only part of this lateral projection. It also disappears with the return of normal sensibility. Education consists in daily practice with an instrument devised by Professor Amar. The stump is passed across a steel flat surface on which there is a small button whose height above the surface can be raised. By continual practice the patient becomes conscious of contact with the button and learns to localize the sensation. Another method of education is to hang a small basket on the stump, and to train the patient to recognize changes in weight. At first he recognizes changes of only thirty to forty grams, but later his sensibility increases so that when only ten grams are added or subtracted he can tell the difference accurately.

PRINCIPLES OF SUPPORT

The principles of support utilized in prosthesis of the lower limb are derived from the laws of human statics. If we consider an individual in a standing position we know that his body weight is transmitted to the ground through the foot by way of the os calcis and the first metatarsal. In the sitting position the weight is transmitted through the tuberosity of the ischium. From this Hendrix deduced the first principle—the weight of the body is transmitted to the ground always by fixed immovable bony prominences of limited surface. Hendrix also stated the second principle—the soft parts of the body are always the points of secondary support. To this we may add a third means of support which is support upon the end of the stump.

For amputations above the knee the prosthetic apparatus must, therefore, be so arranged as to receive the body weight at the tuberosity of the ischium. This is nature's own method and cannot be improved upon. In practice, from the earliest days peg legs have been made with this consideration in view. In looking over various forms of orthopedic splints we find that in them, also, this principle has always been utilized. The Thomas splint is a notable example. It is only necessary, therefore, that the top of the apparatus secure a good grasp of the thigh and be hollowed out in the region of the ischium in order to hold the tuberosity securely. Since the *amputé* actually sits in his apparatus, it will be found that the shape of the upper edge presents but slight differences no matter what the form of the apparatus.

As a secondary support the soft parts of the stump are compressed by the socket of the apparatus. As these soft parts are in the shape of a cone with the base upward it is evident that a considerable bearing may be obtained. The actual utilization of this means of support varies greatly with different models of apparatus.

For amputations below the knee we have not the same indication of the natural method of support as in the previous case, but we can at least utilize the same principles. The bony prominences are the inner tuberosity of the head of the tibia, the tibial tubercle, and the head of the fibula. However, it has been found in practice that the head of the fibula stands pressure but poorly and usually becomes sensitive. For this reason in actual practice only the head of the tibia is utilized and it is quite sufficient. Secondary support is found here again on the soft part of the stump. The top of the apparatus, therefore, reaches to the patella when the patient is in a standing position. This top edge is hollowed out in front and curves upward at the sides. The posterior edge varies with different models. In some it is cut away as in front, while in others there is a double curve with a middle projection which is intended to fit into the popliteal space when the knee is bent in flexion.

The principles of support as above stated are common to all types of apparatus no matter what the model. How they are actually utilized varies according to the materials and the method of fitting. An interesting difference of method is found between those who fit their apparatus by means of a plaster cast made from a plaster mold of the stump and those who fit their apparatus directly to the stump itself. At first thought it would seem that a socket made of a material which lent itself readily to being modeled upon a plaster cast would be more accurate in fit than a model made of a material like wood which must be hollowed out inside and in which the fitting is judged by putting the stump inside. However, we must remember that the plaster cast is made with the stump in a passive condition, whereas the wooden socket is fitted with the stump in an active condition—that is, while it is undergoing pressure. The Belgian orthopedic surgeon, Dr. Martin, regards the stump as purely passive, which the facts show it is not. Anyone who has made plaster casts must be struck by the difference in appearance between a true cast and a cast made by using plaster bandages. The first exerts no pressure upon the stump, the second exerts pressure because the bandage is actually pulled. In stumps where the atrophy has been great and the bone constitutes the major part of the stump outline, as in old amputations below the knee, a photographic reproduction of the stump at rest corresponds closely to the outline of the stump when it is actually bearing pressure. But where a stump is surrounded by a considerable quantity of soft tissue, it will be found to change form under pressure. If a socket for an apparatus is made for such a stump from a plaster cast taken in a passive position, when attached and in use it will have a tendency to displacement. This is due to the fact that the soft parts, under pressure, occupy a smaller space than was anticipated and for this reason reach to a lower level in the socket than was intended. The amount of displacement of the apparatus will depend altogether upon the prominence of the bony salients. If these are well marked, the apparatus remains held in place by them. If they are not well marked, the apparatus will slip upward, with shortening of the leg as a result—an effect which shows that the secondary support upon the soft parts is not being utilized. Another method of showing the difference of outline between the passive and the active stump is to make a cast of a stump under conditions of pressure. When a mixture of plaster is just beginning to harden in a bucket let the patient force his stump into it; make a cast from this negative and compare it with a cast of a stump made under resting conditions. One will be found quite different in shape from the other.

For these reasons it is evident that to insure the best utilization of the support furnished by the soft parts of a stump, it is not sufficient to make the socket according to a plaster cast taken from the stump in a passive condition. The better way is to fit the socket directly to the stump under the same conditions of pressure as when it will be worn.

It is also clear from the above explanation that a socket must be made of a rigid material, in order to prevent the stump from turning. It would seem possible to secure the necessary rigidity by means of rigid supports combined with a corset of leather or cloth to be laced tightly about the stump, which would obtain the maximum of support from the soft parts of the stump. Such, however, is not the case.

The stump serves two purposes: first, that of a means of support, and second, that of a lever for moving the apparatus. The socket of an apparatus must be adapted to both of these ends. But it is evident that if it is composed in large part of a yielding material like leather, which is laced about the stump, there will be a certain amount of lost motion upon the movement of the stump before that motion is imparted to the apparatus. In other words, a material cannot be yielding enough to lend itself to lacing and at the same time have the quality of extreme rigidity. The two are incompatible in the same material, although it is possible to lace such a corset so tightly that it becomes almost rigid.

We must accept the principle that to secure the best utilization of the support of the soft parts it is necessary to have a firm, even compression of the entire stump. Yet if a corset, opening in front, is laced tightly about a stump the pressure is felt chiefly in front because the corset must be attached in at least two places to lateral supports or side irons. The effect is, then, to flatten the stump in front. If, in addition, another opening with lacing is placed at the back, the effect is to compress the stump and flatten it again on this surface. Two lacings are no nearer than one to obtaining that firm, even pressure which is the ideal, and without which the patient sooner or later complains of discomfort.

Also a leather that is heavy enough to have the necessary stiffness must be molded in order to make it conform to the stump. Inevitably, after a time, under the action of the greases and perspiration of the skin, it softens and loses its shape. It has then lost whatever little rigidity it ever possessed. When a leather corset, moreover, is molded to the flesh, it is intended to fit in one position only. It cannot be pulled by a lace into another position and be expected to fit equally well.

For the above reasons there is nearly complete unanimity of opinion among men of actual experience in fitting artificial limbs that the socket must be made of a rigid material.

The question of end support is one that has been raised periodically. Curiously enough, the surgeons have not been willing to accept the views of men used to fitting apparatus. The war has done a great deal to clarify the situation. As from a theoretical standpoint it would seem ideal to make a man stand on the end of his stump in his apparatus in the same way that he rested his foot upon the ground before he lost his leg, the surgeons have invented operation after operation directed toward making the stump capable of bearing weight.

It has not been found practical, however, to fit apparatus in this manner. The idea of fitting is to make the stump and the artificial limb one. This can only be attained by the use of the cone principle. Every stump through a smaller or a greater part of its extent resembles a cone with the base upward. When this condition is utilized, every change in form of the stump through pressure only tends to make the fit more perfect. The weight of the body forces the stump into the socket where it simply lodges more securely, since the chief support, as also the greatest diameter, is at the top. On the other hand, if the primary support is at the bottom, the value of the cone principle is lost, and changes in the size or shape of the stump will mean play in the part of the socket above the end of the stump. The result is the same as if there were provided at this joint an extra joint with a very slight amount of motion. This objection is of great importance as there should be the greatest solidarity between the stump and the artificial limb. Otherwise there is not only loss of motion in the play of the lever but also a feeling of great insecurity, which is an absolute obstacle to efficient employment of the apparatus. Another good objection to the principle of end support is the fact that all rotation of the apparatus upon the stump must be prevented. To secure perfect stability, the bony prominences such as the ischium and great trochanter or the tuberosities of the tibia must be held so securely that they immediately become points of support and carry the weight of the body. It is impossible to divide this support between the end of the stump and these bony prominences and to distribute the weight equally between them. The points are too far separated. It, therefore, becomes necessary to select either the upper points or the lower point as the main means of support; and since it is impossible to walk in an apparatus which has the slightest tendency to twist, the upper points must always be chosen.

If one watches a man put on his artificial limb, one will always notice that he reaches through an opening in his apparatus below the level of his amputation, gets hold of the end of the sock which covers his stump, and gives a strong pull on it. This procedure is performed habitually by every man who wears an apparatus with a rigid socket. It has been taught him by the makers of artificial limbs and has probably been passed along in that business for many years. The act may seem unimportant, but it makes all the difference between comfort and discomfort. It has the effect of pulling down the outer surfaces of the soft parts of the stump and of accurately lodging them in the hollows of the socket where they are intended to rest. If end support is utilized as the chief means of support, this act becomes impossible.

This does not mean that end support should not be utilized when it does exist, but simply that it should be regarded as of secondary importance. There are two means of utilizing end support. The first is to place a rigid support, usually of wood, in the shape of a shelf, across the interior of the socket at the proper level. This, however, is unsatisfactory because it is extremely difficult to fit and also because it makes it impossible to pull the stump down into place from below. Another means is to use a small leather cushion with straps which pass through openings in the wall of the socket and are provided with buckles so that the man can himself pull up the cushion and fasten it where it will bear the right amount of pressure.

In two types of amputations of the lower limb the ends of the stumps are used as the chief means of support. These are for the thigh, disarticulation of the knee and the introcondylar amputation; for the lower leg, the Syme and the Pirogoff amputations. One look at these two types of stumps shows the reason for utilizing the principle of end support. Both are alike in that the stump is larger in diameter at the lower end than a short distance above, which means that it is impossible to utilize the cone principle as in other stumps. In order to pass the stump into the socket from above it is necessary either to give up the attempt to make the walls of the socket press against the stump along the entire length or to make an opening in the wall of the socket so that the bulbous extremity will have room to pass to the end. This opening will then be closed with leather or some similar material which can be laced across. While there is lost something in the way of strong support, there is compensation in the fact that the bulbous extremity of the stump is largely bone, the soft parts being reduced to a mere superficial layer. The bone itself has characteristic prominences and with the opening in the socket can be fitted with comparative ease so that there will be good end support and no twisting. The surface of the end of the stump is broad—four or five times the size of the bone at its diaphysis. It gives, therefore, a good gripping surface. Moreover, in these particular amputations the socket extends to the same point on the stump as sockets for other amputations at a higher level and thus gets a bearing upon the bony prominences that are always used. The large opening in the wall of the socket at its lower end makes it possible to distribute the weight more easily than in the other types of amputation that we have considered.

For these two types of cases our rules of support are changed. They are, in this order:

1. Chief support on the end of the stump.
2. Secondary support upon the ischium for cases above the knee and upon the tuberosities of the tibia for cases below the knee.
3. Tertiary support upon the soft parts.

For all other cases they are as follows:

1. Chief support upon the ischium for thigh cases and upon the tuberosities of the tibia for leg cases.

2. Secondary support upon the soft parts of the stump.

3. Tertiary support upon the end of the stump when possible.

PROVISIONAL APPARATUS

As we have seen from our study of stump changes, a certain time following an amputation is required for a stump to reach its definite form. During this period the stump is constantly changing in size and shape. To fit a man during this time with a final type of prosthetic apparatus is a costly and unprofitable operation. As the socket of such an apparatus is rigid, it cannot follow the change in the stump outline. It must, therefore, be changed frequently and each new socket means an expensive process of fitting which will raise the cost of the final artificial limb to many times its original price. Also time is needed before a man with a sensitive stump in which he has little power can develop the strength necessary to manage a complex and to him relatively heavy piece of mechanism.

The artificial limb makers have recognized this difficulty and have evaded it rather than attempted a solution. They have usually refused to fit an apparatus to a recent case and have advised the use of a stump shrinker during the interval. This is a leather corset which encircles the stump and can be laced tightly about it so as to hasten to a limited extent the pressure or secondary atrophy. There has been no uniformity of directions about the length of time that this should be worn, and most of the limb makers claim that every stump will change after the fitting of an apparatus no matter what has been done before. They admit usually that the apparatus must be changed at least once in order to insure a good fit.

The solution of the problem is to be found in the furnishing of provisional apparatus. Such apparatus must be cheap and extremely light. In the French army every man who has had an amputation has the right to two forms of apparatus; one, an *appareil de secours* or provisional apparatus, and the other a permanent apparatus. The practice now is to furnish the former as soon as the patient is sent to a *centre d'appareillage* or institution of prosthetic equipment, but it should be furnished earlier for men have often been six months in hospital before they are sent to such an institution. The provisional apparatus furnished is of the peg leg type and extremely bad. For amputations of the thigh it is essentially the same peg that has been used by the poor for so many years.

This leg consists of a wooden shaft surmounted by a hollow wooden socket in the form of a bucket. The upper edge of the socket is hollowed out on the inner side and at the back to receive and hold the tuberosity of the ischium. The inside surface of the socket and the upper edge are finished with a leather lining. On the outside of the leg a straight upright of wood extends above the edge of the socket and is fastened to a leather belt, which encircles the top of the pelvis and serves to hold the apparatus in place. A suspender which passes from the inner side of the socket to the sound shoulder also helps. This peg leg is manufactured in quantity in three standard sizes, and according to the size of his stump one of these pegs is handed out to the *mutilé*. No attempt at individual fitting is made.

One needs no particular knowledge of the subject of prosthesis to pass judgment on such an apparatus. All support is borne upon the ischium, while the stump plays upon the interior of the socket like the clapper of a bell.

As the socket exerts no pressure upon the soft parts, it fails to promote the shrinkage of the stump. It is purely a means of locomotion.

For amputations below the knee the usual apparatus given to French soldiers is the barbaric peg in which support is borne upon the bent knee. This practice cannot be too loudly or severely condemned. At the end of a certain time it always results in a limitation of the power of extension of the knee and a marked external deviation of the stump. Atrophy of the stump is but little hastened. The poor fellows who wear it are robbed of the ability to achieve that 100 per cent. return to efficiency which practically all cases of amputation below the knee can obtain when well treated and equipped with good apparatus.

A good provisional apparatus should hasten the process of stump shrinkage. It should also be designed to prevent deformity, to facilitate functional re-education of the limb, and to have a salutary effect upon the patient's mind.

There is always danger that prolonged immobilization following an amputation will limit the power of movement in a joint through complete or partial ankylosis or will produce deformities by the contraction of unopposed muscle groups or the contraction of scar tissue. It is evident that the prevention of these troubles depends in large part upon the care given by the surgeon. Nevertheless, early mobilization of the stump by means of early use of provisional apparatus will be of extreme value. The use of crutches over a considerable time is always attended by a change in the statics of the individual—an adaptation of the organism to the uniped method of locomotion. To correct the resulting bad postural attitude is a very difficult thing in practice, particularly when a man must learn to walk by the aid of an artificial limb, which, under the best of circumstances can never approximate in value the member that has been lost. For this reason the crutch habit must be prevented. Walking is a complex operation involving an alternate and extremely delicate change of balance. It is a habit that we learn in childhood and, like all habits, can be in large part forgotten when unused. A final consideration is a psychological one. Following the loss of a limb there is always a profound depression which in turn is succeeded by a period of adaptation. The reaction during this latter period may take one of two directions. Either the patient resigns himself to a life of invalidism, or he tries vigorously to take up the normal activities of life, fixing his hopes upon being able eventually to earn his own living. If while this reaction is taking place, he can be shown by an actual demonstration that he can be made to walk in comparative comfort, he will receive a great impetus in the right direction.

The ideal type of provisional apparatus is, therefore, one that can be given at a very early date after the amputation, often even before the complete cicatrisation of the wound. Such an apparatus must fit accurately and bear the pressure upon points which are not sensitive. It must be extremely light and should as nearly as possible imitate the statics of the permanent apparatus which is to follow later. The cost should be low because the apparatus must be changed frequently to correspond with the changes in the size of the stump and must above all fit the stump so as to cause the maximum pressure atrophy in the shortest time.

It must be admitted that up to the present no provisional apparatus has realized all of these conditions. Among the various interesting models which may be mentioned are the cardboard peg legs invented by the Danish Dr. Zvindt, the wooden peg legs used by Dr.

Hendrix, and the plaster of paris apparatus used at Vienna by Hans Spitzy and since modified by Dr. Martin of the *Ambulance de l'Océan*, at La Panne, Belgium.

The Zvindt apparatus is made of a strong cardboard which is rolled into a cone, with the small end resting on the ground and the large end molded to fit the ischium. The size and shape of the part of the cone that holds the stump is made after measurements of the stump and the whole cone is held to this shape and made solid by a covering of starched bandages. The upper edge is covered with felt where it fits against the skin and supports the major part of the weight. For below the knee cases, it is possible, though not easy, to make a similar apparatus that bears upon the tuberosities of the tibia, but owing to the difficulty of getting a good result many of these cases are fitted with the knee bent. For thigh cases the apparatus is comfortable, very light, often weighing only three pounds, extremely cheap, with an estimated cost of one to two dollars, and lasts very well. It serves as a provisional apparatus, and after the final apparatus is furnished it is intended to be kept and worn as a relief from the heavier type, just as a man with both his legs would put on a pair of slippers after wearing heavy boots all day. The only objections that may be brought against it are, first, that it is a peg; and, second, that it does not maintain an even pressure upon the stump. The pressure is almost altogether borne upon the ischium, and after a short time the stump plays about in the interior just as with the French type of apparatus.

At the Belgian Hospital of Bonsecours at Rouen, Dr. Hendrix has done some interesting work with provisional apparatus, using old wooden sockets from wooden artificial limbs that on account of stump shrinkage have had to be renewed. All such old sockets have been kept until from among their large assortment may be found sizes that will fit almost any thigh stump well. With light wooden or steel side pieces a simple and extremely light peg leg is constructed. This work is interesting because it is the first attempt that I know to classify thigh stumps according to size and shape so that sculptured wooden sockets may be furnished beforehand in quantity ready to fit. However, this method cannot be applied to below the knee cases as there the irregularity in outline of the stump is too great. Also the method hardly yet lends itself for use with large groups of cases.

The most satisfactory all around provisional apparatus so far devised has been made of plaster of paris. It has been in use at several of the French orthopedic centers, notably at Nancy by Dr. Froelich, by Dr. Hendrix at Rouen, and by Dr. Martin at La Panne. The latter, especially, has developed and perfected its use until he has been able to apply it to practically every stump and has been able to suppress almost completely the use of crutches. The plaster is applied in the form of bandages over the stump and is molded so that it supports the usual bony prominences and in addition exerts an even pressure upon the stump. Where necessary, as for example, under the buttock where extra strength is required, a piece of wire screen is added to the plaster for reinforcement. To the inner and outer sides of this plaster covering are applied long wooden or steel side pieces, and additional plaster bandages are again applied, thus securely incorporating them into a solid support. When the plaster has set, the cast is removed and allowed to dry. Then the lower ends of the wooden or steel supports are screwed into a wooden block in the form of a peg, the lower end of which is covered with a rubber cap. For thigh amputations and hip disarticulations the side pieces are always of wood. The apparatus is fastened to the body by means of a webbing suspender which passes across the shoulder upon the opposite side and is attached to a wooden traverse connecting the two lateral uprights a short distance below the top. Another band of the same material passes around the waist and is fastened to the plaster cast in the region of the great trochanter, by means of an iron hook placed in the plaster at the time of its fabrication. For amputations below the knee, the side pieces are of strap iron two to three millimeters in thickness and one and a half to two centimeters in width. These irons are slightly shorter than the opposite leg. At their upper end they are articulated with two side pieces of similar material which extend along the inner and outer sides of the thigh. Great care must be exercised in placing the articulations of these irons at the right level at the knees. This is preferably at the level of the lower edge of the femoral condyle, which is practically horizontal. Also these two irons must be parallel to each other if they are to work freely. In making the apparatus plaster bandages are applied to the stump and then the irons are laid in the right position, care being taken to see that their axes are the same as the axis of the stump. Additional plaster bandages are then applied and the apparatus is finished in the same manner as for above the knee cases. Below-the-knee apparatus is fastened on by a leather corset which encircles the thigh and laces in front. This corset is fastened by rivets to the upper side irons, which are bent to conform to the shape of the thigh, being curved inward above the femoral condyle. Dr. Martin calls attention to the fact that the head of the fibula usually does not support pressure and for this reason he usually covers it with a small pad before beginning the application of the plaster.

This apparatus is extremely satisfactory, and its universal use would constitute an important step in the right direction. The materials needed are simple and are available to practically every surgeon. They are, in addition, materials to which a surgeon is accustomed and he requires, therefore, only a small amount of practice to be able to make the complete apparatus. A socket made in this way fits the stump accurately and is sufficiently plastic so that stumps which are not completely cicatrized may support the body weight without pain. Dr. Martin has been able to get men who have lost the lower leg to walk in as short a time as eight days, and thigh cases within fifteen or twenty days.

The only criticism, and it is a constructive one rather than a destructive one, of this procedure, is that it is not comprehensive enough. So far, all provisional apparatus has been made in the form of a peg leg. As we shall see later when we consider the relative merits of the peg and the articulated leg, there is fundamental difference between them as regards their statics. It is sufficient to say at present that once a man has walked on a peg leg for some time, it becomes extremely difficult for him to get over his peg leg habit. For amputations of the lower leg this difference is not of great importance. The only articulation involved is that of the ankle and so long as a man does not bear his weight upon the bent knee it makes very little difference as far as habit is concerned whether he walks with a peg or a foot at the end of his apparatus; for above the knee cases, however, it is quite different, and reports from many French centers are unanimous in saying that many of these cases never learn to walk with knee flexion even when equipped with the best artificial limb. In my opinion, this is due in large part to the long continued use of a provisional peg leg and the use of an apparatus containing a knee articulation only after a confirmed habit of walking with a stiff knee has been acquired.

We have called attention before to the fact that prosthesis should be a continuous method of treatment. Supplying provisional apparatus in the form of a peg leg only does not conform with this principle; for giving a man a final artificial limb amounts then to an abrupt change in the method of treatment.

A man who has lost a leg never has difficulty in learning to walk with a peg leg; it is the simplest form of locomotion possible. On the other hand, a man always has difficulty in learning to walk with an articulated leg; he must actually be taught. He should, therefore, from the beginning have practice with an articulated leg. In other words, provisional apparatus should, as nearly as possible, embody the statics of the artificial leg; a knee articulation should be supplied. At first this might be quite rudimentary, but it should be such that it could be changed later for a complete knee joint.

PERMANENT OR FINAL TYPES OF ARTIFICIAL LIMBS

Permanent or final types of prosthetic apparatus are, as the name implies, the perfected mechanisms that are finally given when the stump has reached the end of its period of change. The permanent appliance may be either a peg leg of an articulated artificial limb, built to perform as nearly as possible the functions of the absent member, but in either case, it is constructed with the idea that it is to last and stand hard service. For these reasons it differs from the provisional apparatus in being the product of skilled labor and the best materials, and is naturally much more costly.

The period at which it may be given varies greatly, depending upon the method of treatment that has been pursued and the policy of the physician. The usual policy is to give it at the earliest possible moment after the stump has reached the limit of its change in form. When a stump has ceased to change is, however, a matter which cannot be definitely settled. In a large number of cases the stump will undergo still further change in size and shape after the final apparatus has been given. It is desirable that this should be so, because otherwise there would be a wait of such length that the efficiency of the individual would be seriously affected. With a system of supplying a good type of provisional apparatus at the earliest possible moment, the maximum change in the stump will have been completed in six months. That is to say that every amputation case should be ready to receive an apparatus at the end of that time. Slight changes will take place after this but they can be corrected by giving a new socket at the end of another six months. In all cases, one exchange of socket should suffice.

In the first years of the war the French *amputés* had to wait frequently as long as fifteen to eighteen months before obtaining their permanent apparatus. As the war continued, the organization of the service became better and this period has been very much reduced, although it is still entirely too long. Some men are now being fitted at the end of six months but because good principles of provisional prosthesis have not been observed, the men equipped with artificial legs of wood will always require several changes of socket.

The Belgian practice at the *Ambulance de l'Océan*, where, under Dr. Martin, a comprehensive system of provisional prosthesis is in use, is to give permanent apparatus for amputations below the knee at the end of three to four months, and for above the knee cases at the end of five months. Perhaps this is too early, but experience is not yet conclusive on this point.

FRENCH OR 'ORTHOPEDIC' MODELS

The various types of permanent apparatus known as the French or 'orthopedic' models are of two general kinds, although they are all made of the same material and have the same general construction. They are either articulated legs pure and simple or peg legs with a joint at the knee which can be held stiffly by a lock. The regular peg can be interchanged with another peg which has a foot on the end. The peg leg is intended to serve both as peg and articulated leg, but actual experience shows that practically no one can wear the foot or walk with it. This type, therefore, upon examination resolves itself into a peg leg and we will postpone its consideration to the section dealing with that subject, confining ourselves here to a description of the artificial leg.

All artificial limbs for purposes of study or description are composed of several parts—the socket which holds the stump and supports the body weight, the prosthetic column which corresponds to and replaces the missing part of the limb, a system of attachment which fastens the apparatus solidly to the body, and the articulations which replace the missing joints.

The French artificial leg is composed of a leather socket braced by a steel frame, to which is attached a leather prosthetic column with a mobile foot. For thigh amputations the socket is a hollow cone of heavy cowhide molded to the shape of the stump and extending from the region of the knee to the top of the thigh. Its upper edge is rolled back and sewed over a strip of felt padding so as to prevent chafing of the skin. The socket is open in front and furnished with eyelets by which it may be laced about the stump. The inside is lined with a soft material to prevent irritation.

The socket is reinforced by a light steel frame to which it is fastened by means of rivets. This steel frame is composed of two steel strips twenty-two millimeters in width and four millimeters in thickness which are curved to correspond to the outline of the leg and which extend upward along the inner and outer sides of the leg in the middle of the lateral surfaces, from the foot to the top of the thigh. They are articulated at the level of the knee. The inner side-piece extends to the perineum while the outer one is longer and terminates at the level of the great trochanter. The outer one is articulated at its top with another steel upright about six inches long and of the same size which is fastened to a leather belt that encircles the waist and helps to fasten the apparatus to the body. The upper ends of the two steel side-pieces are connected by a steel band in the form of a semicircle which fits around the posterior surface of the socket at its upper edge and is fastened to it. This band is covered with leather and is shaped to fit the tuberosity of the ischium. The socket is still further reinforced by another light steel band which encircles it just above the knee and which is riveted to the lateral supports as well as to the socket.

The leg piece or prosthetic column is simply a cone of leather molded into the form of the opposite leg and braced by the lateral pieces of the steel frame. The upper edge at the back is cut away so as to permit flexion of the leg without this rim striking against the thigh piece. The lower ends of the steel side bars are fastened to the foot by means of a bolt. The part corresponding to the ankle region is formed of a wooden block in the shape of the ankle which extends upward four inches and is joined at its top to the lower edge of the leather calf. This block secures rigidity and at the same time serves as a fixed point for the ankle mechanism. The foot is of wood roughly shaped to the outline of the normal foot. Toward the toes it is divided in order to permit the introduction of a joint. This joint is secured in a simple manner by means of a leather hinge on the under surface and a rubber cylinder which is placed between the two wooden portions with its ends contained in holes bored for that purpose in the opposed surfaces, and which serves as a buffer. Toward the ankle the foot is pierced by the bolt which forms the axle for the articulation. The anterior and posterior lower edges of the wooden ankle block are cut obliquely from below upward. These oblique surfaces serve as blocks to limit the motion of the foot and abut against shoulders hollowed in corresponding parts of the foot. They make the limit of motion of the foot upward an angle of ninety degrees formed by the foot with the axis of the leg. Downward the motion is limited to an angle of one hundred and thirty degrees. A spring of the ordinary cylindrical type contained in a hollowed portion of the foot connects the foot with the ankle block and secures the return of the foot to the right angle position when weight is not being borne upon the heel.

The knee articulation is extremely simple. The lower ends of the two steel side bars of the thigh piece are curved backward in order to permit the location of the articulation at a point one centimeter in the rear of a perpendicular dropped from the great trochanter. This is in order to secure stability and prevent the leg from giving way when weight is borne upon it. The upper ends of the lower side bars are double, with a space between the two leaves into which penetrates the lower end of the other bar. A bolt secures the two in place. By this arrangement the weight is distributed between the actual bolt and the lower end of the steel bar, which rests in the groove previously described. The lower end of each steel bar is cut accurately to a right angle and the groove in the lower portion of the articulation fits against this so as to prevent extension of the leg upon the thigh piece beyond the desired point, which is when the axis of the leg becomes parallel with the axis of the thigh. Usually a leg of this type is provided with a lock. The bi-lateral lock is the better, as a lock on one side only does not secure enough rigidity and soon wears out. Usually an additional means of regulating the amount of extension of the knee is provided by a leather strap fastened at its upper end to the middle of the transverse band encircling the lower end of the thigh piece. At its opposite end the strap is fastened in a similar manner to the back side of the lower leg. This strap is provided with a buckle so that its length may be regulated at will; it serves as a tendon to limit the forward movement of the leg. A leather cord fastened to a steel spring is connected inside the leg with the posterior surface of the leg piece below and the anterior surface of the thigh piece above. This serves as a propulsive mechanism and tends to bring the leg back to the position of extension after flexion.

The apparatus is fastened to the body by the leather belt before described, which encircles the waist and is fastened to a steel upright, which is articulated in the region of the great trochanter with the outer steel upright of the thigh piece. In addition, a small leather band starts from the front of the belt and, passing around a small pulley secured to the inside of the leg, is brought up behind and again attached to the leather belt at the back. A webbing suspender fastened to the front and rear of the leather socket and passing across the shoulder on the opposite side of the body completes the apparatus.

The French model for amputation of the lower leg is in construction similar to the model for thigh amputations just described. The socket is of heavy cowhide, lined with satinette to give a soft contact at the points of pressure. It is molded to conform to the inner and outer tuberosities of the tibia, which are the chief points of support. The upper edge of the socket in front is concave in form and fits the lower edge of the patella when the wearer is in a standing position. At the rear, the rim of the socket is again concave in form so that the leg may be bent without cutting into or pressing upon the under surface of the thigh. A vertical opening at the back allows the socket to be laced tightly about the stump.

The socket is supported by two steel uprights twenty millimeters in width and three millimeters in thickness, to which it is fastened by rivets. These two steel side-pieces are connected at their lower end with the foot and are curved to conform to the outline of the normal leg. At the level of the lower edge of the femoral condyles they are articulated with two similar steel side-pieces which extend along both sides of the thigh to a little above its middle. These latter are bent inward sharply just above the femoral condyles until they are in contact with the thigh and thence upward conform to its outline. Riveted to these side-pieces and laced around the thigh in front is a leather corset by which the apparatus is fastened to the body.

Below the knee the side bars are connected by a steel band which curves about the front of the socket, one inch below the upper edge. This serves as an accessory support for the socket and a reinforcement at the point where it is most likely to lose its shape. The lower end of the socket is four inches above the ankle articulation; from there downward, for purposes of solidity, the leather is replaced by an ankle block of wood. A steel band encircles the leg at the point of junction between the wood and leather and solidly reinforces the two.

The foot and ankle mechanism of this model is the same as in the thigh model previously described. The knee articulation is also made in exactly the same manner with blockage to prevent extension beyond the desired point.

For cases of very short stump, there is a special model which differs from the one just described in that an additional point of support is obtained by substituting for the thigh corset with its steel supports the upper part and socket of the thigh model which presses on the tuberosity of the ischium. The lower part of this socket is cut away at the supracondylar level, which allows the knee and stump of the leg to be passed through and the latter inserted into its socket below the knee articulation.

For cases where the stump cannot be extended on account of ankylosis of the knee, there is still another model which presses not only upon the tuberosity of the ischium but also upon the surface of the bent knee in the same manner as does the common peg leg for bent knee.

For Syme and Pirogoff amputations the apparatus is of the same general type, but the chief point of support is the end of the stump. Secondary points of support are the condyles of the tibia. The apparatus consists of a leather socket molded as before to conform to the shape of the stump, and extending to the same height and terminating in the same manner as the ordinary socket for below the knee cases. However, on account of the peculiar shape of the stump with its bulbous extremity corresponding to the bony outline at the malleolar region, the socket is larger in cross section at its lower end than at a point four inches above it. From this latter point it broadens again until the top is reached. In order to permit the passage of the enlarged extremity of the stump a large oval opening is cut in the posterior surface of the socket. This opening extends for a distance of six inches from the bottom, and is closed by a leather flap which can be laced across it.

The socket is reinforced by a steel support on each side and by bands of light steel which encircle it at the top and again near the lower end.

The chief difference between this model and the others previously described is in the ankle mechanism. On account of the length of the stump the ordinary foot with ankle mechanism cannot be used, as it would make the leg too long. In the ordinary Pirogoff stump there is only four to six centimeters clearance between the end of the stump and the ground. For this reason the part of the foot that articulates with the end of the socket is much flatter than in the ordinary foot, and is hollowed out to permit the introduction and movement of the socket. At the sides of the wooden foot and in a line with the outer and inner malleoli are placed two short steel uprights a little over one inch high, which at their upper ends are articulated with the lower ends of the steel socket supports. This articulation is in the form of a male and female joint. The upper piece is horizontal at the lower edge and rounded at the back and is received into a slit made by two steel leaves soldered together at their lower end and secured there by a short bolt. The movement of the foot is limited in dorsiflexion to an angle of ninety degrees with the axis of the leg, while in plantar flexion there is an extreme range of motion of about twenty-five degrees. By means of rubber buffers and an arrangement of springs the return of the foot to the right angle position is secured whenever there is no weight upon the foot.

For disarticulation of the hip, the model is a combination of the model for thigh amputations and a superimposed socket designed to receive the half of the pelvis. This socket is of leather in the general shape of a shell with the opening on the upper inner side. Its lower edge supports the tuberosity of the ischium and the soft parts covering the lower part of the pelvis, and follows the line of the perineum. Its outer edge curves gently upward to a little above the crest of the ilium, to which it is accurately molded. The front edge conforms to the shape of this part of the body and supports the groin and part of the front wall of the abdomen. The back edge supports the gluteal muscles of the amputated side and extends almost to the intergluteal fold. The socket is made of heavy cowhide reinforced with thin steel bands. To the top band is fastened a strong leather belt which encircles the waist and is secured by a buckle. Attachment to the body is completed by suspenders which pass over the shoulders, and are fastened in front and rear on the unamputated side to the belt and on the amputated side to the leather socket.

The thigh piece corresponds in form to the corresponding part of the thigh model previously described except that the two lateral supports brace not a socket for the stump of the thigh but a leather cylinder whose only purpose is to give the outline of the missing limb. Two strong steel bands in the form of a circle connect the two side bars horizontally and provide the necessary solidity. The upper ends of these steel side bars are articulated with steel supports of the socket. These articulations are of the same general type as those previously described for the knee and for the ankle in the models for Syme and Pirogoff amputations. The articulations are located at different levels. The one on the outside of the leg is at the level of the great trochanter and is with a steel band which is dropped down along the external side of the socket. That on the inside of the leg is just underneath the perineum; the upper part is in the shape of a T, the two horizontal branches being bent upward and riveted to the band which encircles the inner margin of the socket. The vertical branch of the T is very short and its lower end is secured to the upper end of the inside thigh piece by a bolt. The outside articulation is much larger and heavier than the inside one and is provided with a spring lock which ordinarily secures rigidity but which by pressure on a button can be released to permit flexion in the sitting position.

The knee articulation, the leg, the ankle articulation, and foot of this model are exactly similar to the corresponding portions of the model for thigh amputations. It is not intended that there should be movement of the hip articulation in walking, for this has never been found practical with any form of apparatus, but flexion of the knee is permitted.

Such then, in brief, are the so-called orthopedic types of artificial limbs which have been developed especially by the French manufacturers, and which may be considered as the essentially French solutions of the problem of prosthesis for amputations of the lower limb.

Their manufacture requires a high amount of skilled workmanship and the best of materials. However, all prosthetic apparatus must be judged from the viewpoint of results; the most beautiful models are useless unless they serve to make the maimed man walk. From this point of view the models just described are extremely unsatisfactory. Every apparatus should be judged on the following points: first, comfort and fit; second, weight; third, locomotion; and fourth, durability. A fifth point is cost, but this is only relative; an extremely costly apparatus which gives good service and extreme durability will be much cheaper in the long run than an apparatus of much lower cost and less durability. The cost, therefore, will only be of influence in judging between two models where all other things are equal. We shall criticise the French models from these various viewpoints.

I. *Comfort and fit.* A leather socket is made of cowhide and molded to conform to the shape of the stump and the bony prominences, which are used as the chief means of support. In the beginning such a socket will fit well, but under the influence of perspiration and the greases of the skin it soon becomes impregnated and soft; it loses its shape and in many cases actually begins to rot. In thigh amputations the effect of this process is to loosen the upper edge of the leather socket which holds the tuberosity of the ischium in the hollow prepared for it with the result that the socket slips forward and the apparatus tends to twist or turn. Tightening of the laces serves only to compress the stump but in no way tends to hold the apparatus in its normal position. The same observation is true of all other models constructed in this manner. The final result is that pressure is made upon parts that were not intended to withstand it and pain and chafing of the skin almost always follows. I have examined many men with actual abrasions of the skin due to this cause. At the end of a certain time, usually a few months, the apparatus ceases to fit well and the wearer of it begins to complain. In hot weather when perspiration is profuse, this discomfort is particularly noticeable because the apparatus is badly ventilated.

II. *Weight.* All these forms of apparatus are extremely heavy and the weight in addition is badly distributed. The center of gravity in these apparatus is farther from the stump than in almost any other. This means that the lever which is constituted by the stump is always working at a great mechanical disadvantage. The French *mutilés* all complain of the weight and many prefer to wear their provisional peg leg for all but dress occasions. The following are average weights for the various forms of apparatus:

Model for hip disarticulation : 7 to 8 kgs.
Model for thigh amputation : 3 kgs. 800 to 6 kgs.
Model for leg amputation : 3 to 5 kgs.

III. *Locomotion.* Almost always walking is difficult. Flexion of the knee is very slight in the thigh models and there is always a tendency to swing the leg outward in a circle to secure the necessary foot clearance. As the socket softens this becomes more pronounced and the stump partially withdraws at each step from the socket which serves to lengthen the leg. The patient fatigues quickly and the maximum distance that he can walk is greatly reduced.

IV. *Durability.* The durability is very poor. The articulations quickly develop play and the steel supports break. Repairs are expensive not only from the point of view of cost but also from that of time lost. The maximum life of such an apparatus is rarely more than a year and the latter six months are much less serviceable than the first.

V. *Cost.* The price of the apparatus as sold to the French government is 300 to 325 francs. This is the maximum price that can be paid according to the credits voted and the official *cahier des charges.*

AMERICAN TYPES OF ARTIFICIAL LIMBS

The American leg, as we have seen, has been developed by many men, all private manufacturers. Competition has been keen and for this reason there has been much stimulation to invention. The principles of prosthesis in use have remained the same but there has been considerable divergence in mechanisms to secure the articulation of the knee and ankle, the propulsive mechanism, and the methods of suspension. These are the selling or talking points in which each firm can show a difference in construction all its own and for which it can make claims of superiority. The materials and method of fitting have remained the same in all cases, however.

The essential feature of the American type of leg is that it is constructed of wood and has no accessory supports of leather or steel except for the joint mechanism. It differs from the system of prosthesis that we have just studied in that an entirely different kind of socket and different method of fitting the stump are employed. The socket is a rigid one carefully sculptured to fit the stump, and instead of being molded by the stump actually molds the latter. The American leg differs also in that it employs a different system of statics.

The socket is sculptured out of rough wood. In order that it may fit accurately, the men who do the work must have a high degree of skill. Indeed, there is no kind of socket that *a priori* would seem less liable to give comfort than this which encloses a sensitive stump in a wooden casing with the idea that this wooden casing is to carry the body weight. Such a socket must be made with extreme care, must to a certain degree be the mold of the stump, or rather, its matrix.

For the sake of lightness and strength combined with ease of working, willow (mountain) has the preference among woods. Linden or basswood may be used as a substitute.

The stump is inserted into the socket bare or covered only by a woolen sock and has direct and intimate contact with the wood. It adheres to it throughout its length and breadth. The rigid walls must even exert a light pressure upon the soft parts, the muscular and fatty tissues which pad the central bony parts. On the other hand, the bony prominences must never be compressed. For this reason it is necessary to hollow little depressions or ledges in the wooden walls in order to fit the bony prominences. The bony prominences thus encased serve as the principal points of support because they are unchangeable, while the soft parts serve as points of secondary support.

The workman begins by boring a hole in the center of a block of wood which is roughly cut externally to the desired form. The hole is then enlarged until it begins to admit the stump into its interior. A man accustomed to this kind of work can judge very well by a glance at the stump the general outline and size of such an opening.

The stump is then introduced as far as it will go, and the opening is enlarged appropriately. The same process is repeated until the stump fits exactly in the desired manner. There are two guides—the first is the patient himself who indicates where the pressure is felt unduly, the other is the appearance of the stump when it is withdrawn quickly from the socket. Where the pressure is being exerted normally the skin will be red; where it is being exerted unduly, white. Of course this local ischæmia disappears very quickly. A good workman can do the internal fitting of a socket in one to two hours with a maximum of four to five trials. This is the ideal method of fitting.

Several other methods of fitting have been developed with the idea of doing it at a distance. Thus from plaster molds of the stump, plaster casts have been made which are used for fitting either by hand or by machine. A lathe has been invented and used by the firm of Hangar for actually turning the internal form of a socket from a plaster model of the stump. This, however, has not proved very successful in practice, and is used but little. In addition it has been found that a plaster model of the stump does not give the form of the stump when it is bearing pressure, as has been shown in the section on Principles of Support. Another method is to trace an outline of the stump on paper in two planes so as to give a pattern. This is then cut out and used as a guide for the first fitting of the stump. By means of this system the socket can be prepared fairly accurately and one fitting is usually sufficient to permit the final finishing of the interior. Both of these methods were developed in the United States as a result of the close competition for orders, so that companies might do business with people at a distance. Elaborate forms were sent out which the maimed man was to fill in himself with all the necessary measures. It has always proved an unsatisfactory method of fitting, however, and all companies advised men to come to the workshop. In war work the problem is different as it is possible to collect all the cases of amputation in different centers where the actual fitting and sculpturing can be done.

Examination of the socket for a case of amputation below the knee reveals more fully the system of suspension of the stump in the socket and the great care required in fitting. The principal points of support are the bony prominences of the head of the tibia, the lower surface of the lateral and mesial condyles of the tibia, and the flat triangular surface just below the tibial tubercle on the anterior surface of the bone which narrows down to be continuous with the crest of the tibia below. The head of the fibula constitutes an important bony prominence which can also be utilized, but great care must be taken to see that all weight is borne on its lower surface as pressure on other surfaces causes great pain. The secondary support of the body weight is upon the soft parts of the stump, and an accessory point of support will be the end of the stump in case it is able to bear pressure there.

The socket externally is roughly in the shape of a truncated cone with the base upward. In a horizontal cross section it has a triangular shape with the apex toward the front, conforming to the crest of the tibia, and the base at the back in the shape of a flattened curve. This rear surface must compress the soft parts of the stump in order to hold the bony points of support forward in their places. The top of the socket extends upward as far as the lower edge of the patella which corresponds fairly accurately with the intra-articular line of the knee. In front the rim slopes gently upward on either side from this lowest central point, the highest point being on either side of the knee in a midlateral position and on the level of the axis of the joint. The outline of the socket at the back is almost parallel to the front edge and has the same general shape. It is important to maintain this edge as high as possible because otherwise in the sitting position the stump tends to slip out backward from the socket. A gentle flare outward is given to the top of the socket in order to avoid pinching of the skin. If the hand is introduced in the interior of the socket several depressions will be felt corresponding to the bony prominences. These are, commencing from the outside, the hollow for the head of the fibula, then a convex surface sloping forward which presses upon the lower surface of the internal condyle of the tibia, then, farther forward, a flat surface which rests upon the anterior surface of the head of the tibia below the tibial tubercle. On the mesial surface is another hollow which lodges the mesial condyle of the tibia. From the top the hollowed interior cone slopes in its upper third outward and downward and from this point inward and downward. Hendrix was the first to call attention to this double curve in the shape of the bony outline of the leg. As he rightly observes, the importance of following this direction is especially noticeable in cases of double amputations. Otherwise in walking the feet are placed widely apart.

For the sake of lightness the external shape of the socket corresponds roughly to that of the interior. However, in order to reproduce the form of the missing leg, the thickness of the wall varies at different points. The minimum thickness is about four millimeters and the maximum about ten.

The practice of various manufacturers differs with respect to making the entire leg piece of one or of several pieces. In general it may be said that for ease of working on the interior and for economy of wood it is preferable to make it of two parts. It has been proved that two such pieces can be glued and fastened together with wooden keys in such a way that the union is more resistant when subjected to pressure than a single piece. The usual point of junction for these two parts is slightly below the middle at the point where the diameter of the leg narrows to conform to the shape of the ankle. The lower piece is conical but with oval section. The base is downward, and the lateral surfaces follow the shape of the malleoli. On the lateral surfaces, extending from the top downward a distance of four to five inches, grooves are cut and in these are placed the lateral steel supports for the knee articulation. To avoid splitting of the wood and to fix the supports more solidly two cross arms are usually placed upon these bars extending outward one to two centimeters, and giving them roughly the form of a cross. These bars are held by rivets which penetrate the entire thickness of the wooden wall. The ends of the bars project above the top of the socket a distance of two centimeters and are circular in form and bored through their centers to receive the joint bolt. The bars are parallel to each other and to the midplane of the leg. In addition they are situated at the same level and the plane traversing them is parallel to the ground.

After the insertion of the side steels the external surface of the leg piece is sand-papered and smoothed down. It is then covered with glue and a thin layer of sheepskin which has been previously moistened is stretched around it and held temporarily by tacks. After this has been allowed to dry for twenty-four hours, the edges are trimmed and fastened down with glue and the whole is varnished or enamelled. The internal surface is also protected with varnish.

Such a socket, no matter how carefully fitted, needs some system of suspension to fasten it solidly to the leg. In cases of amputation below the knee this is accomplished by means of two lateral steel supports articulated to the tops of the side bars previously described, which at a distance of fifteen millimeters above the level of the articulation are curved sharply inward until they come in contact with the surface of the thigh. From this point they extend upward a distance of twenty centimeters, conforming all the way to the shape of the thigh. These bars are riveted to a leather corset which encircles the thigh and is laced together in front as in the corresponding French models previously described.

For amputations of the thigh the socket is prepared in the same manner as for amputations below the knee. It is hollowed out of a rough wooden block and the same care is taken in securing an accurate fit. The chief support here is upon the tuberosity of the ischium with secondary support upon the soft parts of the stump. An accessory point of support will be the end of the stump in cases where this is possible. Dr. Hendrix utilizes the means of support offered by the pubic branch of the ischium, but he is alone in this practice as practically everyone else has found this point painful.

METHODS OF FITTING THE SOCKET

There are two general ways of fitting the socket to the stump. They are the circular and triangular methods. The former is the older method, while the latter is of more recent date. It is extremely important to prevent the apparatus from twisting and turning upon the stump. If the top of the apparatus is given an inclination from outside inward and above downward the perineal region will be lodged upon the lowest part. This inside part is called the perineal support. By means of this obliquity, which is given to the upper part of the apparatus by certain American manufacturers, the thigh piece is prevented from turning. The posterior part of the rim prevents rotation outward, for this would mean that the perineal region would be raised, which is against the law of gravity. For the same reason the exterior rim prevents rotation inward. Of these two rotations, the rotation outward is least likely to occur because of the position of the tuberosity of the ischium and the fold of the buttocks. It is, therefore, possible to flatten the posterior edge, provided that there remains some upward curve. This shape has certain advantages in that it prevents the apparatus from cutting into the buttocks in the sitting position and in addition allows full play of the gluteal muscles during walking. It is commonly used and is called by Ducroquet "the semi-oblique method of fitting."

As a matter of fact, the apparatus tends to rotate inward, never outward, during walking. When a man equipped with an apparatus with a horizontal upper edge takes a few steps, the apparatus is not blocked by any rise in the upper edge and turns inward. This is due to the movements necessary to make a step. When the artificial leg is brought forward and comes in contact with the ground, the pelvis lies in an oblique position, the iliac spine of the normal side lying behind that of the amputated side. When the healthy leg is brought forward in its turn, the inclination of the pelvis changes, and the iliac spine of the normal side lies in front of that of the amputated side. The femur is dragged along with this forward movement of the side of the pelvis. The stump has a tendency to turn outward in its socket, and in consequence the apparatus turns inward in relation to the stump. This rotation continues little by little with each step. If, however, the upper front edge of the apparatus slopes upward and the apparatus is tightly fastened and well suspended, this tendency is corrected during each step. The perineum tends always to drop to the lowest point and the apparatus regains its proper position.

If the top of the socket is given a diameter equal to that of the base of the stump itself, the perineal support tends to push strongly against the perineum when the weight is carried by the artificial limb. This pressure becomes extremely painful, and the man is unable to walk. It is what happens in cases where the apparatus is too large for the stump. The support must be taken upon the ischium but if this is to rest comfortably upon the perineal support, it is necessary for the diameter of the apparatus to be less than that of the base of the stump. When these conditions are realized, the ischium rests not upon the center of the perineal support but more at the back.

The method of fitting the American type of socket is similar to the method of fitting the French socket. Where in the latter the steel supports are curved and direct the soft parts outward, in the wooden model the surfaces of the apparatus are curved outward. This form frees the ischial region and permits the apparatus to take a larger area of support.

Certain manufacturers use an altogether different procedure. They give, instead of a circular shape, a triangular one to their apparatus. The inner edge of the apparatus, extending from the ischium to the muscular cord formed by the adductor muscles, is practically a straight line. A cross section of the apparatus at its upper part shows that the apex of the triangle corresponds to the great trochanter, and that the sides extend in two convex lines to join the extremities of the inner straight edge. The soft parts are compressed into a triangular form, thus preventing the rotation of the apparatus which has the same form. Two concentric triangles cannot turn the one in the other. In addition, the angles of the triangle of the apparatus are fixed by the femur, the ischium, and the adductor muscles.

The ischium is the only bony point that can stop the slipping up of the apparatus when weight is placed upon it. The ischium lies at the posterior part of the perineum whose anterior part cannot tolerate any pressure. It is, therefore, necessary to free this part of the perineum by hollowing out the edge of the apparatus so that the ischium is supported upon the higher part. But, on the other hand, it is important to prevent the ischium from penetrating into the interior of the apparatus, in which case the pressure would come against the perineum. In order to be sure that the ischium will rest upon the upper edge of the apparatus, the diameter of the latter must be less than that of the stump at its junction with the body.

If the top of the apparatus is too large, the wearer holds his stump away from his body, in a position which tends to depress the inner edge of the apparatus and relieve the pressure upon the perineum. He walks with his amputated leg at a distance from the axis of his body and acquires a marked limp because the leg is thus rendered shorter. This position is, of course, extremely fatiguing in addition to being very unsightly.

If the top of the apparatus is sufficiently narrow, it can be circular in shape without excavation for the perineum. However, this form is defective for the reason that it leads to the progressive rotation of the apparatus.

The outward curve of the socket frees the perineal region and renders possible the support against the ischium. The fleshy parts are directed outward. Seen from in front such an apparatus has an external convexity of the external surface and the internal surface has a convexity inward. If the anterior surface of the socket has a forward curve and if, in addition, the knee is mounted with slight flexion of the thigh, and the stump with slight flexion of the hip, the wearer will actually be sitting upon his apparatus.

When the apparatus or thigh piece has a straight form, the upper edge of the apparatus causes a disagreeable pressure upon the ischium. We may add that the movements of extension are often much limited, especially in cases of very short stump. The extensor muscles of the thigh being sectioned, the short flexors pull the stump into a position of flexion. This is the more marked the shorter the stump. If the apparatus is straight, the short stump is not able to follow it in movements of extension during walking. It slips out of the apparatus if the anterior edge of the socket is too low. In the contrary case, it remains flexed at right angle.

When a man is standing, the pubic ramus of the ischium to which is fastened the perineal partition lies in an angle of forty-five degrees with the ground, sloping downward and to the rear. The ischium is the posterior part of the perineum and is at the same time the lowest point. It is the ischio-pubic region which, corresponding to the genital-crural fold, marks the line between the base of the thigh and the perineum that cannot tolerate pressure from an apparatus. If the circumference of the socket is smaller than the circumference of the limb just below the ischium, the socket can rest firmly against the ischium, even when circular in form. The ischium will not descend inside the socket. But this constriction exerted on the stump can easily exceed the limit of toleration. The best solution of the problem is to excavate the inner edge so as to produce a perineal depression which rises toward the rear under the ischium and gives a solid point of support at that level.

It is important to maintain the stump in close adherence to its socket. If it adheres badly the patient has less control of his apparatus when walking. He becomes fatigued by useless efforts.

In order to fit the stump well the socket must have a general conical form in its interior because all stumps are more or less conical in shape. The apex of the cone will be truncated. The conicality is especially noticeable in the lower third. In the upper two-thirds the socket presents certain peculiarities which are worthy of study.

The anterior surface forms a large hollow with its long axis vertical. This is designed to lodge the anterior muscular mass of the quadriceps, which the convexity of the femur renders very prominent. The outer lateral surface is also in the form of a hollow with vertical axis. This hollow has a curve of large radius and extends upward to the collar, the name given to the edge of the socket. At this point the concavity becomes more marked and tends to form a sort of beak. This side of the apparatus extends upward considerably higher than the inner surface, and from this fact the hollow is the more marked. The inner surface is vertical; there is no hollow but an outward curve quite pronounced at the level of the collar. This curve is made necessary by the presence of the adductor tendon of the thigh, the compression of which must be avoided. The posterior surface, like the inner surface, presents the same outward curve toward the collar, but this curve is much less sudden than that of the inner surface. It is rendered necessary by the shape of the posterior muscles of the thigh and the muscles of the buttocks.

The collar is at the rim of the socket and plays an important rôle from the point of view of support. It is the upper bearing point of the socket. Its form is that of a triangle with the base at the inside of the leg. The two sides are the front and the rear edges. The junction of these edges constitutes the apex. These two edges have a gentle slope upward to the apex. The difference in height between the apex and the base is four, six, or eight centimeters. In front the edge of the socket is about three centimeters below the groin, following the obliquity of the groin. If it mounts too high, the socket cuts into the soft parts when the man sits down, compresses the groin, and forces the stump to slip out of the socket. On the other hand, if the edge is not high enough, the anterior muscles of the thigh are insufficiently lodged and tend to slip out forward. The patient has the feeling that he is going to fall forward. Sometimes it happens that the front edge exerts too great pressure on the stump, so that tissues form a painful roll lying above the rim. This also happens when the front wall of the socket is not sufficiently hollowed out to lodge the anterior soft parts of the stump.

The apex of the triangle ascends to the level of the trochanter. When it terminates at a point three or four centimeters below this prominence, the patient is not well fitted. He has a tendency to lean outward and he suffers on account of the compression of the soft parts bruised by the rim.

The rear edge from the junction of its middle and external thirds curves outward. This curve is prolonged by the inside edge as far as its point of junction with the front edge. The inside and the rear edges constitute the principal points of support and are called the seat.

Upon the rear edge, which is in the shape of a scroll, rest the ischium and the muscles of the buttock, which are crowded upward and forward by the pressure of the body weight. The scroll is prolonged by the inside border, which is horizontal. It is upon the convexity of this inside scroll that the patient rests the posterior portion of the ischio-pubic branch. The sensation of the person wearing this apparatus is exactly that of a person sitting upon a bicycle seat which has been cut in half lengthwise. The seat of the socket is fashioned in the same manner as the saddle of the bicycle is molded. There is a surface for posterior support which is molded on the posterior edge of the collar. This surface supports the posterior portion of the ischium. The bony pressure there is moderate and is not painful because it is protected by the thick mattress of the buttock. There is also a surface of support, molded upon the inner edge of the collar. Upon this rests the posterior portion of the ischio-pubic branch. The pressure upon this bone is more direct because it is less protected by soft parts. When men are badly fitted, they always complain of pain at this point.

The atrophy of the gluteal muscles is always more marked the shorter the stump. Hendrix, instead of avoiding contact with the sensitive points of the ischio-pubic branch by hollowing the front edge, enlarges this surface of support by molding the collar and preparing a deep, comfortable lodgement, a veritable niche, for the ischium and the posterior portion of the ischio-pubic branch.

This method of widening the collar of the apparatus at the inner or perineal surface is open to objections because it makes the collar come into contact with the inner side of the opposite leg. The perineal groove is very narrow and if a wooden rim of any great width is inserted here the artificial leg must be carried out away from the body in order to prevent interference with the opposite side. It is practically impossible for patients equipped with such apparatus to bring their heels together.

EXTERNAL FORM OF THE SOCKET

The external form of the socket reproduces as nearly as possible, with a due regard to lightness, the shape of the normal thigh. At its top just below the collar the wall has a thickness of only a few millimeters. As it descends it becomes thicker, reaching its maximum thickness at the level of the end of the stump. If the external surface conformed to the internal surface throughout this extent it would be very unesthetic. The maximum thickness of the wall, however, even at this lower level, does not exceed one and one-half centimeters. Below the end of the stump the wall again becomes thin, as from that point the internal surface can conform exactly to that of the outside.

The entire thigh piece is usually made in two portions—the socket and the knee block. The latter usually extends upward a distance of twelve to fifteen centimeters and is joined to the lower end of the socket by means of glue and wooden keys. The whole is reinforced by a covering of calfskin rawhide which is applied in the same manner as for below the knee sockets. The knee block is rounded at the bottom in order that in the flexed position it may conform to the shape of the normal knee.

THE LEG PIECE

The leg piece is the part of the prosthetic column extending from the articulation of the knee to that of the ankle. It is a wooden shaft in the form of a double truncated cone, the apex of the one being superimposed upon the apex of the other. The base of the upper cone corresponds to the calf, while the base of the lower and smaller cone corresponds to the malleolar region. This shaft serves only for the transmission of weight. Its external form corresponds closely to the corresponding portion of the normal leg. Its interior is hollowed until the wall has the smallest thickness compatible with strength and lightness. This usually varies from four to eight millimeters. This piece may be made of one or two parts. In the latter case the junction of the two is at the top of the lower third of the length, and is effected in the same way as the socket is joined to the knee block. The leg piece is sculptured from rough wood and the ability of the wood worker to do careful sculpturing will be demonstrated here. In many shops, however, the outline of this leg piece is determined by a series of tracings or designs which represent different sizes and types of leg. The results obtained in this manner are quite as satisfying to the *mutilé* as the former.

R 31 p
GENERAL LIBRARY
DEC - 2 1918
UNIV. OF MICH.

Publications of the Red Cross Institute for
Crippled and Disabled Men

Edited by Douglas C. McMurtrie

Series II October 15, 1918 Number 3

Education and Occupations of Cripples
Juvenile and Adult

A Survey of All the Cripples of Cleveland, Ohio, in 1916

Under the Auspices of the
Welfare Federation of Cleveland

Reported by
Lucy Wright and Amy M. Hamburger

The Red Cross Institute for Crippled and Disabled Men
311 Fourth Avenue New York City

SOCIAL RESPONSIBILITIES IN THE REHABILITATION OF DISABLED SOLDIERS AND SAILORS.

BY DOUGLAS C. McMURTRIE,

NEW YORK.

DIRECTOR RED CROSS INSTITUTE FOR CRIPPLED AND DISABLED
MEN; PRESIDENT, FEDERATION OF ASSOCIATIONS FOR
CRIPPLES; EDITOR, "AMERICAN JOURNAL OF
CARE FOR CRIPPLES."

THERE are distinct social responsibilities in the rehabilitation for civilian life of disabled soldiers and sailors. In the restoration of the man to self-support, although the medical treatment be thorough and efficient, though reeducational provision be excellent, and though the will and spirit of the men under training may be of the best, yet the complete success of the program will depend upon whether the attitude of the public acts as a help or a hindrance—upon whether the influence on the individual ex-soldier of his family, his employer, and the community at large is constructive or demoralizing.

What, then, is the public duty toward the disabled soldier? For it is certain that the requirements need only to be understood to be fulfilled.

The first responsibility on the part of the family of the injured man is to learn the meaning of dis-

---

Copyright, William Wood & Company.

ability, and see the hopeful rather than the depressing aspect. Just recently in the suburb of a large Pennsylvania city a woman in a swoon was found on the steps of the local postoffice. She had just opened a letter from her son at the front which told of a gunshot injury necessitating amputation of his left arm below the elbow. Immediately there rose before her eyes the terrifying prospect of a life of idleness and possible pauperism. One can imagine what her next letter would be like: saying she knows what the amputation means and sympathizes most tenderly on account of what must be faced in the future. If it were only a leg it would not be so bad, for then he might be able to take care of himself and get some kind of a job, but with an arm off, he could not expect to do that. But she and father have saved up some, and with uncle's help they will take care of him till the end of his days. Picture the influence of this message in comparison with another which might be sent in the light of a fuller understanding of what is possible: "I have just heard of your arm amputation and sympathize most lovingly in your loss. But I know you will not lose your courage, even at this sacrifice for your country. Even now, the national authorities are making plans to make up so far as possible for such losses, as you doubtless already well know. One-armed men can be trained for skilled jobs, especially men with native ability such as yours, and the training is already under way in the city near us. The employers also here are becoming tremendously interested in the subject, and are finding jobs specially suited to men who have lost arms or legs and have promised these jobs to the fellows who return from the front disabled. And you can count on our standing behind you at every step and helping in every way we can. This is really a fine future to look ahead to for if you make good here at home with your handicap of honor, you and we will have true reason to be proud. And of course you will succeed if you go at this obstacle with the same spirit and nerve as have gone toward your work in the army. Your mother will look forward to your return home wearing the uniform of Uncle Sam and flying the colors of a soldier who can't be beaten."

It is greatly to be desired that the families of men going to the front should know of the possibilities of reeducation and reemployment and of the provision being made for the disabled, for it would mitigate not only a great deal of mental suffering over actual injuries but over prospective disabilities as well. It is well known that the greatest fear regarding service in the trenches is not the loss of life but the prospect of returning crippled. As one writer has well put it: "To die for one's country: if one could only be sure of dying!"

In coming down in the elevator of a large New York department store recently, the day following the publication in its pictorial section by a great daily newspaper of the photograph of the first American amputation cases in France, the following remark was overheard: "Did you see those horrible pictures in the paper yesterday? I do hope that Jack will not come home that way: I would rather he be killed." Yet the picture showed only foot amputations and to one familiar with cripples and their potential accomplishments such a disability seems a real inconvenience but nothing more. The woman quoted was suffering unduly in her apprehension.

It is not here intended to minimize the seriousness of the total disabilities but these occur in but one case in a hundred thousand. The point is that many injuries that might be regarded as terrible under unintelligent handling in the past no longer remain so.

The second responsibility of the family is to understand the importance to the disabled soldier of the proffered training for self-support, and to encourage him in every possible way to undertake it. The family must do more than avoid opposition to the soldier's plan for reeducation; they must do more than give it lukewarm assent—they must get behind it with every influence at their command.

Failure to have the family understand and support the program for the future of the disabled man may have disastrous results. In France the mother occupies an unusual place of authority in the family economy. A son may grow up to be twenty, thirty, or forty years old, but mother is still a chief to whom obedience is unquestionably paid. In dealing with the *poilu,* therefore, one must count in his maternal parent as well. At one French center of hospital care and reeducation it was found that; as a man would approach the point of his medical recovery and approach the time of entry on vocational training, his mother was liable to descend upon the hospital office, beat her umbrella on the table, inquire why they were keeping her son so long away from home, and demand his immediate discharge in order that she might take him away "to care for the poor crippled boy for the rest of his life." In vain were explanations and arguments regarding the efficacy of further treatment and training. She had come there determined to take her son away, and the scene would continue until her end was accomplished. And in most instances there was nothing to do but accede to the mother's demand.

But a better way was found of dealing with the families of men deemed likely to benefit by re-education. Under this procedure when the soldier was nearing the end of his hospital care the director of the institution would summon the mother to come in and advise regarding her son's future. She would then be addressed something in this wise: "Your son's medical treatment will, in another week or two, be practically complete, and we thought you might like to know so that, if you desired, you could make plans to take him home. But you know he is permanently disabled and will not be able to go back to his old job of telegraph lineman. We know that you expect to care for him, but he will outlive you, and later, since the government pension is small indeed, he will be reduced to a miserable situation. You remember the cripples from the War of 1870, how they begged or sold trinkets about the streets—and you would not want your son to be in that fix. Luckily, however, he will not have to be for we have something else to suggest. Across the street is a school where the men are taught various skilled trades. If your son cares to stay for five or six months, and you approve, we will teach him to be a telegrapher and he can go back to his home town and get a good job with the government telegraphs. As a skilled worker still he will be doubly respected in the community, he will be a burden on no one, his future will be assured, and you will be very, very proud of him. What do you think wise under the circumstances?"

The whole situation is changed. Mother greets her boy with: "Son, have you heard what they are going to do for you?" And as the son has already been talked to regarding the program, the joint decision is assured.

This illustrates the difference between a family for or a family against the proposal of reeducation.

The third duty of the family is to stand behind the man during his course of training and try in every way to encourage rather than dishearten him. Letters from home which recite all the troubles of life and none of the joys will not help the enterprise. The family reaction should rather be: "Stick to it; we are getting along all right and want to see you finish the job up right, now that you are at it." In other words it is necessary to maintain the morale of the family in the same way as when the man is at the front. This is largely contributed to by home visitors such as those of the Canadian Patriotic Fund or the American Red Cross.

The fourth family responsibility toward the disabled man is to make the home influence as sensible and as truly helpful as possible after his return from hospital or school. The first and very natural impulse when son or husband comes home crippled or blind is to pet him and wait on him hand and foot. Yet the best interests of the family as well as of the man himself demand his being encouraged to do for himself everything he can, with the aim of stimulating that self-dependence which has been the object of his whole course of training. Within the limits imposed by affection the family should endeavor to carry along the spirit of that training.

In the readjustment of the crippled soldier to civilian life the employer has a very definite responsibility. But this duty is not entirely obvious. It is, on the contrary, almost diametrically opposite to what one might superficially infer it to be. The duty is not to "take care of," from patriotic motives, a given number of disabled men, finding for them any odd jobs which are available, and putting the ex-soldiers in them without much regard to whether they can earn the wages paid or not.

Yet this method is all too common. A local committee of employers will deliberate about as follows: "Here are a dozen crippled soldiers for whom we must find jobs. Jones, you have a large factory: you should be able to take care of six of them. Brown, can you not find places for four of them in your warehouse? And Smith, you ought to place at least a couple in your store."

Such a procedure cannot have other than pernicious results. In the first years of war the spirit of patriotism runs high, but experience has shown that men placed on this basis alone find themselves out of a job after the war has been over several years, or, in fact, after it has been in progress for a considerable period of time.

A second weakness in this method is that a man who is patronized by giving him a charity job comes to expect as a right such semi-gratuitous support. Such a situation breaks down rather than builds up character, and makes the man progressively a weaker rather than a stronger member of the community.

The third difficulty is that such a system does not take into account the man's future. Casual placement means employment either in a makeshift job as watchman or elevator operator such as we should certainly not offer our disabled men except as a last resort—or in a job beyond the man, one in which, on the cold-blooded considerations of product and wages, he cannot hold his own. Jobs of the first type have for the worker a future of monotony and discouragement. Jobs of the second type are frequently disastrous, for in them a man, instead of becoming steadily more competent and building up confidence in himself, stands still as regards improvement and loses confidence every day. When he is dropped or goes to some other employment, the job will have had for him no permanent benefit.

Twelve men sent to twelve jobs may all be seriously misplaced, while the same twelve placed with thought and wisdom and differently assigned to the same twelve jobs may be ideally located. If normal workers require expert and careful placement, crippled candidates for employment require it even more.

The positive desideratum is to find for the disabled man a constructive job which he can hold on the basis of competence alone. In such a job he can be self-respecting, be happy, and look forward to a future. This is a duty not so easy of execution as telling a superintendent to take care of four men, but there is infinitely more satisfaction to the employer in the results, and infinitely greater advantage to the employee. And it is entirely practical, even in dealing with seriously disabled men.

Thousands of cripples are now holding important jobs in the industrial world. But they are men of exceptional character and initiative and have, in general, made their way in spite of employers rather than because of them. Too many employers are ready to give the cripple alms, but not willing to expend the thought necessary to place him in a suitable job. This attitude has helped to make many cripples dependent. With new responsibilities to the disabled soldier, the point of view must certainly be changed. What some cripples have done, other cripples can do—if only given a chance.

This, then, constitutes the charge of patriotic duty upon the employer:

To study the jobs under his jurisdiction to determine what ones might be satisfactorily held by cripples. To give the cripples preference for these jobs. To consider thoughtfully the applications of disabled men for employment, bearing in mind the importance of utilizing to as great an extent as possible labor which would otherwise be unproductive. To do the returned soldier the honor of offering him real employment, rather than proffering him the ignominy of a charity job.

The responsibility to the disabled soldier on the part of the community at large is much more complex, since the contact exists at a multitude of points and is at none highly intimate. The first reaction of the public to the returning man is hero-worship of the most empty type—described coldly it usually consists in making a fool of the man and entertaining him in inappropriate and hurtful ways.

One form of this is society lionization—and for but the proverbial six days indeed. To a large Canadian city there returned a disabled soldier after two years' absence at the front. His wife and children had been looking forward expectantly to having him with them, but after his arrival saw but little of the head of the house. As a national holiday was approaching they were counting on his accompanying them to the park, and had exacted a tentative promise that he would do so. But as the morning arrived and mother was dressing the children to start, father made no move to get ready. Almost tearfully mother asked if he was not going with them. "Oh, no," he answered, "I am going for an automobile ride this morning and this afternoon to a sing-song at the—(naming a fashionable hotel)." Thus was the community showing kindness to the returned soldier and helping to put him back on his feet.

The man on the street thinks the greatest service to the disabled fighter, particularly when he is discharged from the army and no longer under the partial protection of the khaki, to consist in buying him at the corner saloon as many drinks as he can hold. From one small American city a social worker reported inability to distinguish as to whether certain discharged men were suffering from shell shock or intoxication, so hearty was the hospitality of the citizens. Such "kindness" requires no comment. Fortunately the war-time measure regarding the liquor trade will soon make this impossible, and will guard the ex-soldier from one pitfall. It may be noted in passing that this will be a boon to the returned men in more ways than one. In Canada at a time when most of the provinces had prohibition and one or two others limited license, the placement of disabled men in employment was many times simpler in the dry territory than the wet. In the latter many men lost jobs again and again by reason of intoxication, not only injuring themselves but weakening the standing of their fellows as well in the eyes of the employers.

Finally there is the great general public prejudice against the disabled, the incredulity as to possible usefulness, the apparent will to pauperize, and the reluctance through usual channels of opportunity to give the handicapped man a chance. Successful crippled and blind men unanimously testify that the handicap of public opinion is a greater obstacle than amputation of limb or loss of sight. And this unenlightened attitude is manifest in every social relation of the disabled—with family, with employer, with the community as a whole.

It becomes clear, therefore, that a necessary feature of any program for restoring the disabled soldier to self-respect and self-support is a campaign of public education to convert the general attitude toward the crippled and handicapped.

This need was recognized most clearly among our enemies by Germany and among our allies by Canada. There was signal failure to appreciate the value of public education in France, Great Britain, and Italy. There is no need of it yet in Belgium as all the disabled men are retained in the army and provided not only with training but with employment as well, and there is no family problem as the men cannot return home.

Within a few months of the opening of the war, the secretary of the German national federation for the aid of cripples made a tour of the leading cities of the Fatherland speaking to meetings of public officials, social workers, and the like, with the aim of disseminating intelligence regarding modern principles and methods of dealing with the disabled. The same authority prepared several pamphlets of popular character which were distributed in editions of over a hundred thousand. There was in existence at the outbreak of the war an excellent monthly journal on work for cripples, and this devoted its columns to the subject of provision for the war disabled. Some other special publications in the same field immediately sprang up. One of these has the interesting title of "From War to Industry."

There has been issued under the title of "The

Will Prevails" a volume of biographies of cripples who have overcome their handicaps—from Tamburlaine down to men disabled in the present war. The book is intended for circulation in hospitals and for general reading. Exhibitions illustrating in a practical way the possibilities of the war cripple constitute another vehicle of public education, and have been held in the leading centers of the empire. Moving pictures and lantern slides are also being utilized for propaganda to stimulate interest on the part of the people and to arouse ambition and courage on the part of the disabled themselves.

In Canada a real and very intelligent effort has been made to acquaint the people with the aim and practice of reeducation. A well-known poster, printed in red and black, entitled "What Every Disabled Soldier Should Know," is widely in evidence throughout the Dominion. It is really addressed as much to the public as to the returned soldier. The text of the poster is as follows:

That there is no such word as "impossible" in his dictionary.
That his natural ambition to earn a good living can be fulfilled.
That he can either get rid of his disability or acquire a new ability to offset it.
That the whole object of doctors, nurses, and instructors is to help him in doing that very thing.
That he must help them to help him.
That he will have to have the most careful and effectual treatment known to science.
That interesting and useful occupations form a most valuable part of the treatment in the convalescent homes and sanatoria.
That if he can not carry out his first duty by rejoining his comrades at the front, and if there is no light duty for him with the Canadian forces overseas, he is taken home to Canada, as soon as his condition and the shipping facilities make this possible.

That his strength and earning capacity will be restored there to the highest degree possible, through the Invalided Soldiers' Commission.

That if he requires an artificial limb or kindred appliance it will be supplied free.

That every man disabled by service will receive a pension or gratuity in proportion to his disability.

That if his disability prevents him from returning to his old work he will receive free training for a new occupation.

That full consideration is given to his own capacity and desires when a new occupation has to be chosen.

That his own will-power and determination will enable him to succeed, both in the training and in the occupation afterward.

That his maintenance and that of his family will be paid for during the training he may receive after discharge, and for a month longer.

That neither his treatment nor his training will cost him a cent.

That his home Province has a special commission to assist him in finding employment on discharge.

That hundreds of towns and villages have committees, associations, and clubs, to welcome him on arrival, and to help in securing a position for him.

That the Dominion and provincial Governments, the municipal authorities, and all sorts of employers, give the returned soldier preference in filling vacant positions.

That the returned soldier wishing to take up land and farm it will be helped to do so, under Federal and other settlement schemes.

That the Invalided Soldiers' Commission exists to carry out his restoration and training in Canada.

That the Board of Pension Commissioners exists to distribute the pensions provided by his country for him and his dependents.

That the Invalided Soldiers' Commission and the Board of Pension Commissioners are in the position of trustees, appointed for his benefit, and representing the whole people of Canada.

That, therefore, he should write direct to the Commission or the Board if he needs advice or help.

Canadians are unanimously resolved that every returned soldier shall have a full opportunity to suc-

ceed. When that opportunity is put within his reach, his success will depend on his own good sense in seizing and using it.

Another poster of pictorial character shows a one-armed man fitted with an artificial appliance at work on a drill press.

The daily press has been supplied with material descriptive of the success of men who have completed training and made good. Some stories have carried with them a little preachment as to the sound attitude toward the disabled soldiers. One concludes with this statement: "Every man doing steady work suited to his capacity is a gain to himself and his country. Every man left idle, or performing some trifling task beneath his capacity, or trying to do work he is unfit for, is wasted. And Canada cannot afford to waste a man."

A remarkable moving picture film in ten reels has been prepared by the government authorities to illustrate the progress of the disabled soldier after his return from overseas. It shows reception at the debarkation depot, transportation in a hospital train, various forms of treatment at military hospitals, recreation, vocational training, and, finally, reemployment in industry. The message of the series of reels is "that injury does not mean pauperism: that every man is given a chance to make good." Where the man does not try to help himself, however, there is shown the opposite eventuality of vagrancy. The film is for exhibition in Canadian military hospitals in England, and for showing to the public of the Dominion.

In the United States there has been as keen if not a keener realization of the fundamental importance of public education to the cause of the disabled as in any other country, and as might probably be expected actual work on such a campaign began at an early date. The Surgeon General of the Army issued in October, 1917, a clear statement of the modern policy and spirit of dealing with the disabled soldier, under the title of "The Passing of the Cripple." Later the same office made an excellent contribution to the cause in the preparation of moving picture films of five successful American cripples who were seriously handicapped, yet had overcome their obstacles. This series of reels was entitled "The Way Out," and was intended for showing to the general public and in hospitals overseas to men who have just met with disabling injury. The set is one item in a "cheer-up campaign," another projected feature of which is the issue of a volume of biographies of disabled Americans who have beaten their handicaps. Still another factor in this work is the issue by the Surgeon General, in cooperation with the American Red Cross, of an inspirational magazine, by name "Carry On," which aims to convey to members of the army medical corps, to army nurses, to Red Cross home service workers, and to the public at large some conception of the new spirit in dealing with wounds, of more kinds than one, which are sustained at the front. This magazine has already a monthly circulation of over a hundred thousand.

An unofficial campaign in the interest of the disabled was early initiated by the Red Cross Institute for Crippled and Disabled Men. One of the most familiar items in this campaign was a small folder of which over seven million copies were distributed, largely through the courtesy of telephone, gas, electric, and other public service corporations. It was titled, "Your Duty to the War Cripple" and its text—which epitomizes the gospel preached in the campaign—read as follows:

When the crippled soldier returns from the front, the government will provide for him, in addition to medical care, special training for self-support.

But whether this will really put him back on his feet depends on what the public does to help or hinder, on whether the community morally backs up the national program to put the disabled soldier beyond the need of charity.

In the past, the attitude of the public has been a greater handicap to the cripple than his physical disability. People have assumed him to be helpless, and have, only too often, persuaded him to become so.

For the disabled soldier there has been "hero-worship": for the civilian cripple there has been a futile kind of sympathy. Both do a man more harm than good.

All the cripple needs is the kind of job he is fitted for, and training in preparation for it. There are hundreds of seriously crippled men now holding down jobs of importance. Other cripples can do likewise, if given the chance.

In the light of results already attained abroad in the training of disabled soldiers, the complete elimination of the dependent cripple has become a constructive and inspiring possibility.

Idleness is the great calamity. Your service to the crippled man, therefore, is to find for him a good busy job, and encourage him to tackle it.

Demand of the cripple that he get back in the work of the world, and you will find him only too ready to do so.

For the cripple who is occupied is, in truth, no longer handicapped.

Can the crippled soldier—or the industrial cripple as well—count on you as a true and sensible friend?

The assistance of chambers of commerce and manufacturers' associations was enlisted to secure transmittal to their members, with a special note of indorsement by the organization, of a circular calling to the attention of employers their responsibility to the disabled soldier. Over two hundred thousand employers were reached direct in this manner and the statement was reprinted in scores of trade journals.

A speakers' bureau was organized, a film and picture service instituted, and the daily press and magazines supplied with informative articles on the work being accomplished abroad in the reconstruction of crippled men. One of the most interesting features of the work was the preparation for individual trade journals of articles on re-education in the particular trade covered by each journal or on employment opportunities for the disabled in that trade. This material proved of very direct interest to both editors and readers of the journals.

Another feature of the campaign was the issue of a booklet in ten foreign languages: Yiddish, Italian, French, German, Hungarian, Polish, Greek, Spanish, Danish, and Swedish. These were distributed to pastors of foreign-speaking congregations and to physicians and social workers in the foreign communities. The text of the booklets was also reprinted by almost every foreign language newspaper in the country.

The work of public education in the interest of the cripple has just begun. It must be continued until the "man in the street" is thoroughly familiar with his responsibilities to the disabled—until the community is converted from its present attitude.

311 Fourth Avenue.

A COMPOSITE FAC-SIMILE

MEDICAL RECORD

A Weekly Journal of Medicine and Surgery

WILLIAM WOOD AND COMPANY Publishers, 51 Fifth Avenue, New York

---

$5.00 Per Annum. PUBLISHED AT NEW YORK EVERY SATURDAY Single Copies, 10c.

ORIGINAL ARTICLES

EDITORIALS

EDITORIAL NOTES

NEWS OF THE WEEK

OBITUARY

CORRESPONDENCE

PROGRESS OF MEDICAL SCIENCE

INSURANCE MEDICINE

BOOK REVIEWS

SOCIETY REPORTS

MEDICO-LEGAL NOTES

STATE MEDICAL LICENSING BOARDS

NEW INSTRUMENTS

MEDICAL ITEMS

DIRECTORY OF NATIONAL AND STATE MEDICAL SOCIETIES

JUST PUBLISHED

URGENT SURGERY

By FÉLIX LEJARS

AN INDEX OF TREATMENT

BY VARIOUS WRITERS Edited by

ROBERT HUTCHISON, M.D., F.R.C.P., and H. STANSFIELD COLLIER, F.R.C.S.

Revised to Conform with American Practice by

WARREN COLEMAN, M.D.

WILLIAM WOOD AND COMPANY, Medical Publishers . . . . 51 Fifth Avenue, New York

Reprinted from the New York Medical Journal for August 24, 1918.

REEDUCATION OF DISABLED SOLDIERS AT BOMBAY.

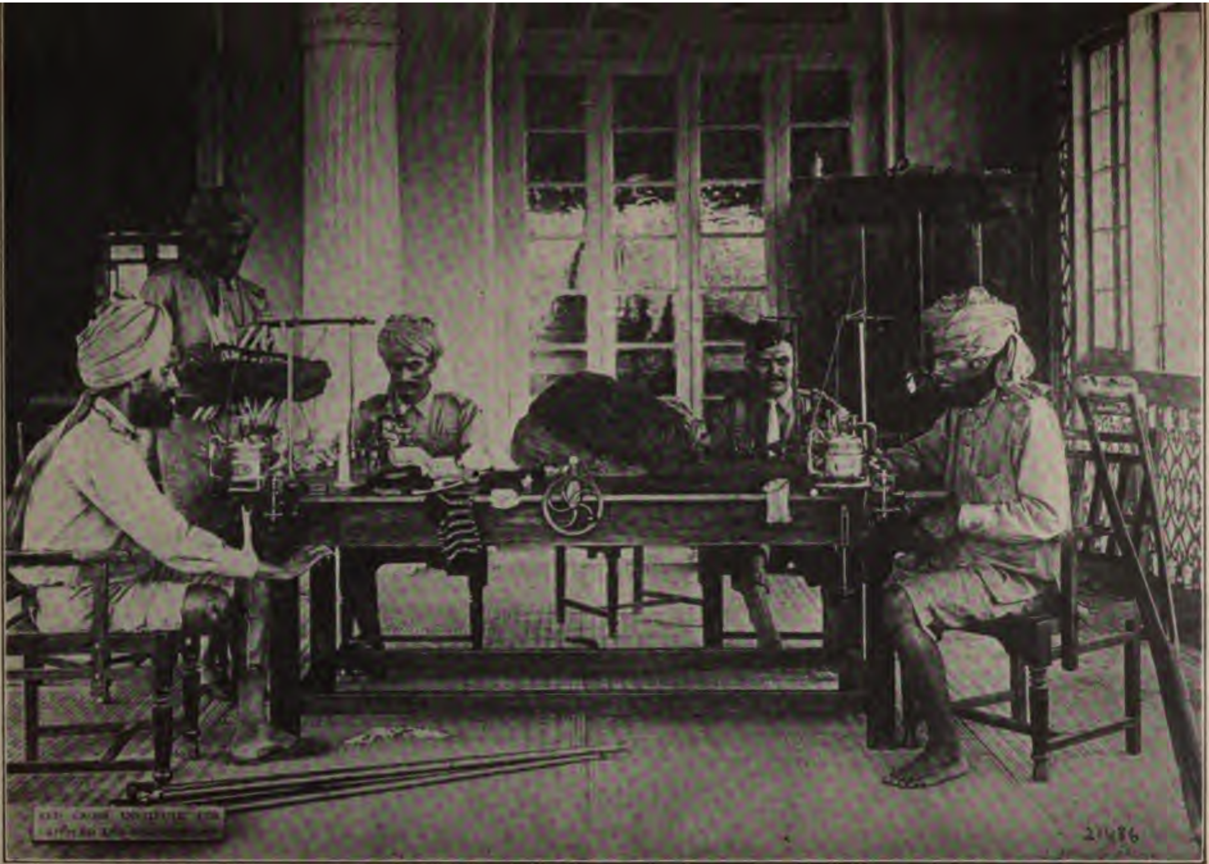
BY DOUGLAS C. MCMURTRIE,
New York,
Director, Red Cross Institute for Crippled and Disabled Men; President, Federation of Associations for Cripples.

Since the outbreak of the war, it has come to be regarded as sound national policy to train disabled soldiers for special trades which they can follow in spite of their handicap rather than leave them to a future of idleness, dependent for support upon pension alone. The enlightened provision by the state of such "reeducation," as it is called, was early made by the European belligerents. The British colonies have, one by one, followed suit, and all of them now offer training for the crippled soldiers of their own forces.

At Bombay, India, is one of the most picturesque schools in the world. It is known as Queen Mary's Technical School for Disabled Indian Soldiers, and was founded about a year ago through the efforts of Lady Willingdon, wife of the Governor of Bombay. Soldiers of the Indian Army, of all ranks and classes, who have been disabled in action or pensioned for any reason as unfit for military service, are offered a course of instruction six months or longer in duration.

The building itself, formerly Braganza Hall, is at Byculla, and was generously placed at the disposal of the committee, rent gratis, by the executors of the late Sir Jacob Sassoon, Bart. It is splendidly appointed with sitting rooms, dormitories, and workshops accommodating 200 men, and is surrounded by beautiful gardens where the pupils take their exercise or spend pleasant hours conversing or reading. Spacious verandas afford them ample space

Copyright, 1918, by A. R. Elliott Publishing Company.



Crippled Indian soldiers intent upon their work at the Harrison knitting machine making socks and stockings, neckties, vests, caps, mufflers, etc., at Queen Mary's School, Bombay, India.

for games and amusements. In the well ventilated dormitories, each man has beside his bed, his own "lock up," in which he keeps his personal belongings.

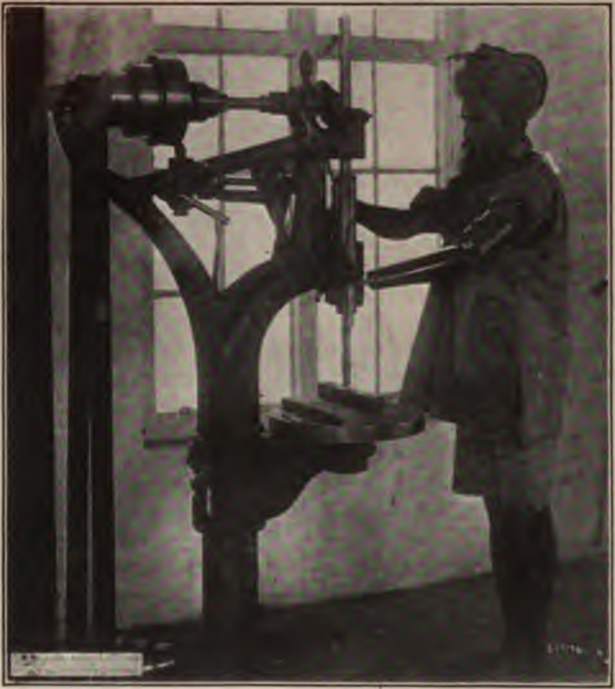
Everything that the disabled man needs is supplied at Queen Mary's School. He is provided with clothes, bedding, and food during his entire training period; he is given a return railway ticket and traveling expenses if he comes from a distance, and very often, after he has completed his course, he is supplied free with a set of tools for his trade. Each man is permitted the choice of the trade that he wishes to pursue.

On a large poultry farm disabled soldiers are taught by an expert instructor all branches of modern poultry raising. The poultry houses are stocked with prize fowls, among them Minorca, White Leghorns, and other species. Breeding by means of incubators is one of the branches taught. The school's spacious grounds offer ready opportunities for teaching the elements of agriculture. Lectures and personal instruction in the most modern scientific principles of the cultivation of grain, fruits, vegetables, etc., are given by experienced men.

Besides poultry farming and agriculture, classes have been started in tailoring, motor car driving and motor mechanics, knitting, carpentering, cinema operating, oil engine driving, fitting and turning, and elementary engineering. A machine shop is being constructed with the following machinery for instructional purposes: metal lathes, wood lathes, drills, nut making and bolt making machines, brass foundry, tin box making plant, copying lathes for making handles of every description, dovetailing machine for making ammunition boxes, electric motors, etc.

The committee in charge of the training uses the following general plan for the placement of trained men: in Bombay and other industrial centres, in workshops and factories; as tailors in regiments, and in the army clothing department; as chauffeurs in the mechanical transport service; as turners, fitters, machinemen, engine drivers, and ammunition boxmakers in the government dockyard, ordnance factories, and arsenals.

There are at the present time about 200 men in the school. A number have received diplomas for oil engine driving, motor car driving, and other trades, and employment has been secured for them at salaries ranging from twenty to 100 rupees a month ($6.40 to $32). The value of such a sum of money must be estimated on the basis that the average man in the school can live easily on twenty ru-



Science finds a way. This Indian soldier uses a prosthetic appliance instead of a left arm, and goes about his work as deftly as an ablebodied mechanic. [Queen Mary's School, Bombay, India.]

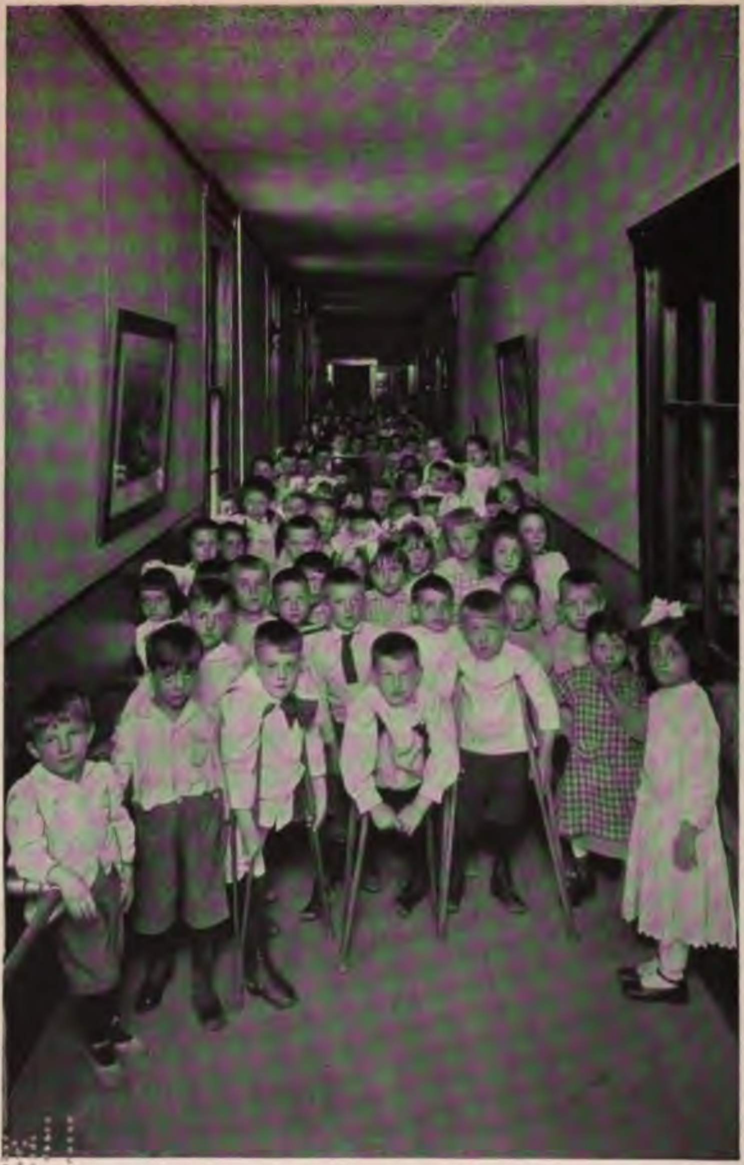
pees or $6.40 a month. Upon completion of his course, he is likely to receive a small sum from the sale of some piece of work that he has made during his training period. The disabled man's pension continues, of course, regardless of his salary.

Artificial limbs are provided for cripples at one of the hospitals in Bombay, while in hospitals at Dehra, Dun, and Mussoorie, electrical and massage treatments are given for disabled men.

In addition to the employment department of the Queen Mary's Technical School, there have been formed at the various centres in India bureaus that take care of the problem of placing disabled men in suitable employment.

The school is under the patronage of the King and Queen of England, and is maintained by a monthly subscription from the Women's Branch of the Bombay Presidency War and Relief Fund, by substantial donations from the Western India Turf Club, and the Bombay Presidency Branch of the Imperial Indian Relief Fund.

Education and Occupations of Cripples
Juvenile and Adult



110 crippled children who 'want more room' and out-of-door life, Willson School, Cleveland

Committee on Cripples of the Welfare Federation of Cleveland

E. M. Williams, *Chairman*
P. W. Herrick, *Treasurer*
W. H. Winans, *Secretary*

Miss Grace S. Harper, *formerly of the King's Chapel Bureau for the Handicapped and of the Social Service Department of the Massachusetts General Hospital, Director, October, 1915, to October, 1916.*

Miss Lucy Wright, *formerly General Superintendent, Massachusetts Commission for the Blind, Director from November, 1916.*

Miss Amy M. Hamburger, *formerly of the Social Service Department of the Massachusetts General Hospital, Assistant Director from October, 1915, Associate Director from November, 1916.*

Dr. Robert H. Bishop, Jr.
Miss Mary Bowles
Dr. F. E. Bunts
Mr. Allen T. Burns
Mrs. W. H. Champney
Mrs. Clarence L. Collens
Mrs. Robert Crowell
Mr. Paul Feiss
Mr. P. W. Harvey
Mrs. L. D. Holden
Rev. W. A. Kane
Mr. Sherman C. Kingsley
Rev. C. Hubert LeBlond
Dr. Ernest Ludwig
Dr. G. N. Morrill
Mr. John Pelenyi
Dr. E. A. Peterson
Dr. John Phillips
Miss Belle Sherwin
Miss Clara Sherwin
Mrs. John Sherwin
Dr. W. G. Stern
Miss Selma Sullivan
Dr. A. R. Warner
Mrs. E. M. Williams
Rev. R. W. Woodroofe

Contents

PAGE

Foreword—Report Committee 9

I. Introduction—Summary of Eight Principal Conclusions 11

II. Analysis of Statistics—Number and Ratio of Crippled Persons—Age—Sex—Color and Nativity—Age at Occurrence of Disability—Form of Disability—Main Causes of Disability—Schooling—Degree of Education — Occupation — Ability to Work—Support 21

III. What May Be Done About the Handicapped—Children—Adults—Conclusion 70

IV. General Tables 89

V. Occupation Lists by Disability—Occupation Studies—Stories of Street Operators 112

VI. Method of Survey—Original Schedule—A Lesson Learned in Tabulating—Suggestion for Revised Schedule 167

VII. Cleveland Resources for Cripples—Ohio Legislation for Care and Education of Crippled Children 187

VIII. The Massachusetts Hospital School at Canton 197

IX. Stories of Successful Individuals in Cleveland 211

Illustrations

FACING PAGE

Frontispiece—110 crippled children who 'want more room' and out-of-door life, Willson School, Cleveland. 3
Original cartoon—'It's a long, hard road—' . . . 18
Cripples at work:
  A one-armed 'steeple-jack' who sticks to his job 36
  Successful laborer with hook appliance 52
  A man who lost his right arm and foreman's position through industrial accident restored to industry by an arm and hand of his own invention 68–69
  Successful as a locksmith for nine years, after literally 'trying his hand' at five different jobs 84
  A judge in the municipal court who wrote his answers to the bar examination with a pencil held between his teeth 164
  Loss of leg below the knee does not keep a factory patrol-man from riding his bicycle 180
  A 'monopede athlete' 196
  Don't fail to note the man behind the handicap! 212
  A successful dressmaker who runs her machine with the aid of a long iron poker 216
Mothers of children with infantile paralysis—1916 epidemic—Newark, N. J.[1] 220

---

[1] Reproduced by permission of the Central News Photo Service.

Foreword

The Committee on Cripples of the Welfare Federation of Cleveland offers herewith, for the service of Cleveland and for any service it may be to other communities, the results of the 'Cripple Survey' for which enumeration was begun in October, 1915, and completed October, 1916. The Survey came about as a result of questions in the minds of people interested in child welfare work and in the general condition and industrial chances of the handicapped. It was undertaken not only with a desire to discover the size and nature of the problem, but in the hope of finding practical guidance towards a community plan for promoting the welfare of cripples.

The Committee wishes to express here its warm appreciation of the ready response of crippled persons and their families to the questions of the schedule. Without their co-operation the Survey could not have been made, and their full and willing replies give the results their real significance. To each one of the crippled persons who have done the cause the added service of permitting the use of photographs in this report, the Committee extends thanks, and especially to the successful cartoonist, who has designed and contributed to the report the cartoon reproduced facing page 18, a piece of work executed with his skillful left arm.

The Committee wishes to express its appreciation of the co-operation of the medical profession, in confirming diagnoses, whenever possible, in the case of crippled children. With their valued aid the results of the Survey are more than doubled in importance in a large proportion of children's cases. The co-operation of hospitals, social agencies and welfare workers in industry, both in finding cripples and in securing confirmed diagnoses, is cordially recognized and appreciated.

For preparation of the schedule and development of the original plan for survey by house-to-house canvass, the Committee is indebted to Miss Grace S. Harper, formerly of the King's Chapel Bureau for the Handicapped and of the Social Service Department of the Massachusetts General Hospital, first Director of the Survey. Because of ill-health Miss Harper resigned as director October, 1916. The immediate direction of the Survey has been continuously in the hands of Miss Amy M. Hamburger, formerly of the Social Service Department of the Massachusetts General Hospital, Assistant and later Associate Director. From November 1, 1916, Miss Lucy Wright, formerly General Superintendent for the Massachusetts Commission for the Blind, Boston, has acted as Director. Miss Wright and Miss Hamburger, with the advice of Mr. John Koren, have made the analysis of schedules and prepared the report submitted herewith. The Committee here records its cordial appreciation of the services of Mr. Koren, who, from the completion of the enumeration, has acted as consultant in the preparation of the main body of the report.

Signed: ALLEN T. BURNS, *Chairman*
ROBERT H. BISHOP, Jr., M.D.
Mrs. W. H. CHAMPNEY
Mrs. CLARENCE L. COLLENS
Mrs. ROBERT CROWELL
SHERMAN C. KINGSLEY
E. A. PETERSON, M.D.
JOHN PHILLIPS, M.D.
W. G. STERN, M.D.
Miss SELMA SULLIVAN
E. M. WILLIAMS
Rev. R. W. WOODROOFE
Report Committee

Cleveland Cripple Survey

I. Introduction

There has been up to this time, with the exception of the Massachusetts enumeration of the lame, maimed, and deformed,[1] no substantial basis for estimates of numbers of crippled children or adults in any part of the United States. The Cleveland Survey is the first city-wide census of cripples in this country, and perhaps the most comprehensive study of its kind ever undertaken. The single fact that by a house-to-house canvass and visits to 150,000 families 4,186 persons were reported by themselves or their families as physically handicapped by defects of skeleton or skeletal muscles indicates a substantial addition to the slight and indefinite information heretofore available.

The Cripple Survey is, however, more than a census in purpose and fact. It has gone to the living sources for all possible information and guidance towards a community plan for improving the condition of the crippled. Its findings represent the ready response of men and women who have had personal experience in living out a part or all of their lives under some form of physical handicap to questions of long standing in the minds of all of us. A man with double club hands and double club feet, with the added disadvantages of a meager education and no medical treatment in his life, but who supports himself and others for nineteen years without any aid, can, if he be a thoughtful person, speak with authority of handicaps. Or a man who throughout life has had a deformed spine and a disabled leg may also have something to tell if he has been fortunate enough to 'make good' in spite of his crutches. And a man who loses his right arm at nineteen, and after literally 'trying his hand' at five jobs finds one at which he can work for nine years with success, may also speak with a voice of authority about the real handicaps of cripples.

---

[1] Massachusetts State Census, 1905.

Who are crippled persons? How many among them suffer a measurable economic as well as physical handicap? What do they need and want of the rest of us? What may the community do for cripples, and what may it expect of them? A single survey in a single city cannot give final answer to these questions, but if the facts can be made to speak for themselves, they will not only point the way to more intensive studies in Cleveland and elsewhere, but bring fresh courage to the handicapped and revolutionizing ideas to the minds of the friendly but often indiscriminating public.

Who are crippled persons? One of the most interesting and valuable points about this Survey is the distinction between the definition of 'cripple' adopted at the start and the one actually used as a working basis by the Cleveland Committee. The change is, I believe, the key to an understanding and appreciation of the point of first significance in the Survey. The original definition adopted by the Committee was practically the one used in the census of cripples in Birmingham, England, in 1911: "A person whose (muscular) movements are so far restricted by accident or disease as to affect his capacity for self-support." The Cleveland Committee, however, found almost at once that the double test of physical and economic handicap would result in a selective census. They found that the same disability was a measurable economic handicap in one case and apparently none at all in another. Moreover, it was clear that nearly all physically handicapped persons and their families, whether economically independent or not, were eager to have their experiences recorded if there were the least hope it might be of service to others. Thus the way was made for an inclusive definition and a democratic census, which is best described by the outline of purpose originally adopted by the Committee: "To discover the economic and educational needs, capacities and possibilities of children and adults in Cleveland who are handicapped because they lack the normal use of skeleton or skeletal muscles." Practically, therefore, the Cleveland Survey recorded all persons recognized by themselves or their families as physically handicapped under this definition, regardless of economic condition. No greater service could have been done the cause of the handicapped, for, like many another cause, theirs has too often been judged by selected facts only. The rise and fall of bureaus for the handicapped and the endless disappointments of handicapped persons, and of philanthropists interested in them, can be traced to the lack of just such a perspective as the Cleveland Survey affords.

Those who have had any considerable experience with the problems of the handicapped know that the fact of physical handicap needs to be looked at from very important angles other than the physical and economic. How does the physical handicap affect the attitude of the cripple toward life? How does the crippled condition of an individual affect the minds of the people with whom he associates? Mental attitudes commonly direct the success or failure of the cripple in the economic world as much as his actual physical disability, and, in many cases, more.

What, then, does the cripple want? What most interests handicapped people is the pursuit of the common goal: they long to share in the race with the rest, to forget their handicap and have it forgotten, except that, if they are to come into the race at all, the chances of some of them must be equalized in practical ways. But the cripple finds that the hardest obstacles to overcome in his whole career are often the ideas in the minds of the rest of us—our mistaken ideas about cripples. An ambitious mechanic, looking for a real job, finds himself classified with the shoestring peddler on the street, just because he has the same disability. A man with crutches hears people 'speaking up loud' to him, exactly as they would to a person with smoked glasses or to foreigners whose language they do not understand. These apparently trivial things are in reality signs of a general inability to see the man behind the handicap, and are the very things that make the cripple think he is helpless. They contribute, without doubt, towards idleness among cripples and help create the group of sensitive recluses who only wish to come out after dark and the discouraged workman who keeps his crippled hand well hidden in his pocket.

The Cleveland Survey has much else to offer, but it was needed for the single task of setting before us the proper place in the community of a considerable group of citizens who happen to have in common certain types of physical handicap—to 'put them right', so to speak, in the minds of their so-called normal neighbors, who are apt to have very mistaken ideas about the ambition, ability, and economic status of those who do not present the same outward appearance as the average person. The results of the Survey may in this sense be examined as a study of what crippled persons in a great industrial community, largely without opportunities for industrial training before or after disablement, have accomplished towards their own economic independence.

In studying the results of the Survey there is one other circumstance which should be kept in mind, as it lends a special value to the findings. It is that the schedules were gathered by a group of well-educated, friendly, and interested visitors, many of whom have considerable experience in life. The almost eager response to the Survey by cripples and their families, rich and poor, successful and unsuccessful alike, clearly reflected the spirit in which the inquiry was made. Rarely in any social investigation have we had a piece of work so generously conceived and supported, with an approach so friendly and successful, and with a response more ready on the part of those visited.

The study comes at a time when the developments of Workmen's Compensation and Employers' Liability Acts complicate still further the already difficult chances of employment for cripples. Employers will not stand for the employment of handicapped labor if it increases insurance rates or their liability for compensation in case of accident—especially if the handicapped workman did not meet with his original disability in their employ. From this standpoint, again, the evidence of the Survey is significant. Whatever present and future complications may be, if the fact of economic independence over long periods of years is once established for numbers of physically handicapped persons, their position is permanently dignified and the laws which work against their industrial employment are correspondingly sure to be modified.

The Survey comes, too, at a time when the problem of the handicapped has been forced on public attention as never before by the ravages of infantile paralysis—a major cause of crippled conditions of the most disabling kind. If any incentive were lacking to fight against this disease and its results, it is to be found in the fact disclosed by the Survey that among all cripples an eighth and among children more than a third have become crippled from this one cause.

Overshadowing every other thought on the subject of the handicapped at this time is that of soldiers crippled in war. Out of necessity the countries first involved, most of them already better acquainted with the problems of cripples than the United States, have been forced to face problems of rehabilitating and re-educating disabled soldiers with a promptness and ingenuity that promise to advance and even revolutionize vocational training. There remains, however, in times of peace for crippled soldiers and crippled citizens alike the difficult problem of lifelong competition in industry. From this point of view every scrap of evidence of continuous accomplishment under serious physical handicap is of inspiring and practical value, to both the cripples themselves and to those who must help them to overcome the obstacles in their way. But the heart of the matter, in times of peace or war, is that we cannot help cripples, nor can they help themselves, until we realize the key fact, that it is what is left and not what is gone that matters. It is not a question of praise for the crippled mechanic or blame for the crippled beggar; it is a question of what he has to work with. Mr. E. E. Allen, of the Perkins Institution for the Blind, speaks often of a blind cripple whom we are apt to think of as neither blind nor crippled, although he lacks a right arm as well as eyes, because, as Mr. Allen says, the dynamite that caused his physical disability seems to have entered into his soul. What there is left of him physically embodies a man of spirit. We probably overestimate at best what we can do to help people. All that is possible is to try to give each man, woman and child equal chances to make the contribution that is in them, be it little or much.

The general tables in which the schedules gathered in this Survey are analyzed are printed in full on pages 89–111 and discussed with illustrative detail in the accompanying pages. They may be studied from many points of view and suggest many problems.

Underlying the whole subject of cripples, for example, is the question of preventive possibilities which is opened up in this study from a social rather than a medical point of view. While the Survey has always been carried on subject to the approval of medical advisers, the study of medical questions, in the professional sense of the word, has been necessarily limited, and the findings offer certain substantial bits of evidence stimulating further study rather than solving preventive questions. With infantile paralysis and tubercular bones and joints confirmed as leading causes of crippled conditions in children, and with accident as a main cause in the case of adults, we have, for example, unmistakable signs of the need of a campaign of education with a wide general discussion and understanding of these main causes of crippled condition and all possible preventive and ameliorative measures. From the nature, scope, and method of the present inquiry we cannot look to the results for more than warning symptoms that should be heeded.

All the problems present in any human lives, moreover, are naturally to be expected and found in the lives of cripples, but are complicated still further by their particular form of handicap. In matters of relief and aid, for example, although crippled conditions are not as largely an accompaniment of age as is blindness, and although dependent cripples are very largely provided for by their families, there are, inevitably, dependent crippled persons who need to have their crippled condition taken into consideration in the determination of form and amount of aid. Otherwise, in principle or method of administration, the problem of their relief does not differ from that of persons handicapped by heart-disease, blindness, deafness or other physical defect. It is a problem of support and of the family rather than of the handicap and the individual.

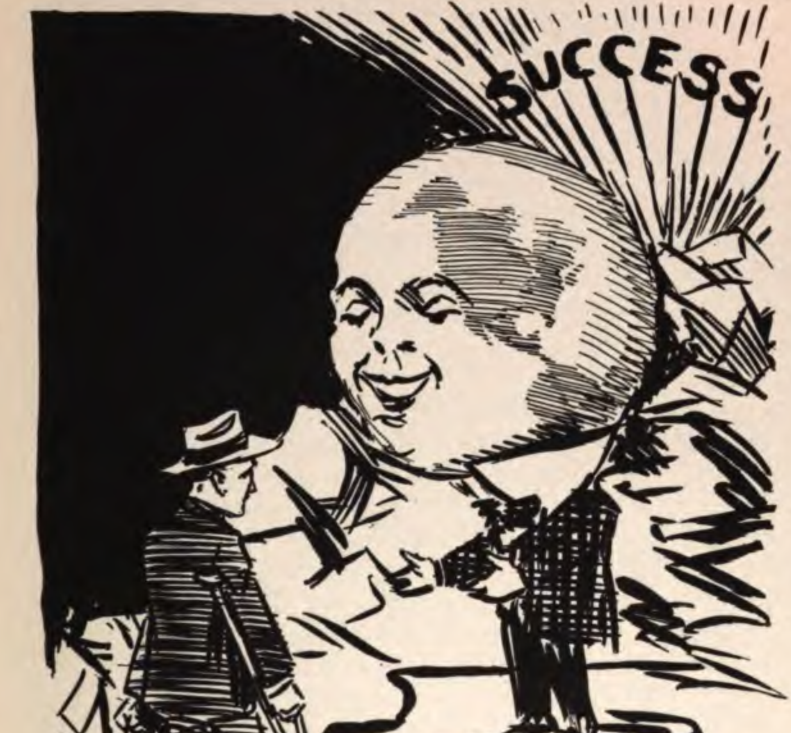
Questions also arise of special aid for families of disabled bread-winners with minor children. Here, again, we have a need caused by crippled condition rather than the problem of the cripple in the technical sense. These needs must be faced and met, and it may tax the persons especially interested in cripples to have them met, but the problem cannot be thought out or worked out except in relation to other general questions of compensation, insurance and relief with which it is bound up.

In matters of education and employment, on the other hand, the essential problems of crippled condition and of the individual must be worked out on the basis of what the cripple has to offer the community rather than on the basis of economic need or lack, and from the point of view of equalizing his chances for taking an active part in life. These problems can best be reckoned with as an integral part of our general educational and industrial life, but require a technical knowledge and experience on the part of those who administer the work if the chances of individuals are to be effectively safeguarded. In this sense educational and industrial needs are the essential points of interest in our study, and from such a point of view the eight principal conclusions to be drawn from it may be briefly summarized as follows:

A. CHILDREN

1. The problem of the crippled population is first of all a problem of child welfare. Although adults were more numerous than the children—more than three times as many— a fourth of the crippled population were not only under the age of fifteen at the time of survey, but a third of the adult cripples became disabled while under the age of fifteen. Thus a total of forty-nine per cent of the whole group were disabled in childhood.

2. As a children's problem it is essentially a medical-educational one. The nature of the causes and the form of the crippled condition, the consequent length of time and well-known conditions of life and treatment needed to minimize the handicap require that provision for medical and educational care be planned in close relation to each other.


SUCCESS
Its a long hard road, but the whole world stands ready to give you a helping hand — and the goal is sure.

This cartoon was designed and executed by a professional cartoonist and advertising expert who has had no use of the right arm, which has been entirely paralyzed from birth

NU

3. The varieties of muscular and skeletal defects are so many, and crippled persons, like normal ones, have so great a variety of aptitudes, that no single or simple means will satisfactorily provide for their vocational preparation. Their needs must, therefore, be met as a part of a general, liberal program for prevocational education.

4. With lively appreciation of the good work of existing agencies, it must still be said that special provisions for the care of crippled children in Cleveland are inadequate, especially in their equipment for correlating medical and educational care and for fitting crippled children for working life. Therefore, new or enlarged means of meeting this need should be provided.

B. ADULTS

5. The problem of the crippled population is a problem of adults in working life. The number who are over sixty years of age is small, the number of those who became crippled after sixty is still smaller. But the number becoming crippled during working life by accident, especially of men, is large, and the number crippled from all causes very large.

6. Cripples in Cleveland, under heavy physical handicap, in direct competition with others, and without special favor of the community, have reached and held remarkable positions of economic independence. Their capacity, occupations, and earnings point on the whole to varied and normal tendencies of life.

7. The great variety of forms of handicap and notable difference in aptitudes and experience prior to becoming crippled point to the need of a most flexible system of service to those among cripples who cannot make their way unaided, but who may be benefited by special plans for their rehabilitation and re-education. This plan may well be a part of an adequate system for vocational training for all citizens.

8. The increased care with which, under existing laws, employers tend to avoid the added risks of liability in employing physically handicapped labor, place the handicapped, however competent they may be, at an increasing disadvantage except

at times and in places where other labor is difficult or impossible to secure.

These general conclusions and the facts in detail upon which they are based disclose particularly two definite directions in which community effort is needed in order to equalize chances for cripples:

First, adequate provision should be made for the medical-educational care of crippled children.

Second, measures should be planned for safeguarding the interests of crippled adults.

To carry out the work of a program of this kind a central bureau or federation is recommended that represents not only existing agencies especially instituted for cripples but all the forces touching their lives most closely—medical, educational, industrial.

In the analysis of statistics that follows the details on which these conclusions rest are discussed and in "What May Be Done About the Handicapped" (page 70) the findings are restated in the light of local resources for cripples and the experience of other states.

One important question underlying any conclusions and any plans that may be made as a result of the Survey is whether there are workers suitably equipped for the lay part of the program, especially for work with adults.

To be of immediate service we need at this time most of all workers of genuine skill in securing medical, social, and industrial estimates of handicapped individuals in season to be of service to them and to the community. We need workers who have acquired wisdom enough to lead in an educational campaign that will benefit all cripples alike in times of peace or war by teaching us when to remember and when to forget that a man has a physical handicap. To classify our fellowmen by a single aspect of physical disability is superficial and futile. If the Survey drives this point home it will do a much-needed service.

II. Analysis of Statistics

NUMBER AND RATIO OF CRIPPLED PERSONS

The number of cripples of all ages found in Cleveland, in an enumeration by a house-to-house canvass extending over a period of one year from October, 1915, to October, 1916, was 4,186. As the estimated population of Cleveland for 1916 was 674,073, this gives a ratio of about six cripples to each 1,000 inhabitants.

In the Massachusetts state census of 1905 a total of 17,134 persons were enumerated as lame, maimed, and deformed. This gives a ratio for the three groups of 5.7 to each 1,000 of the population. The group *maimed* was, to be sure, made to include loss of one eye and a few other defects not included under the Cleveland definition, but even so, the correspondence of the two ratios is interesting.

Another interesting contrast is afforded by the figures of the Federal Census for two other groups of the physically handicapped, those disabled by sense-defects, the deaf as reported in 1900 and the blind as reported in 1910. They show a ratio of deaf persons of 1 + per 1,000 population and a ratio of blind of 1 – per 1,000 of population. Allowing for differences in time and method between the Federal Census and the Cleveland Cripple Survey the larger proportions of the crippled population are clearly indicated. The question at once arises, and awaits answer, why the general problem of the crippled, which is numerically far greater, has attracted so much less attention than the problems of the deaf and the blind.

The following tabular statement shows the numbers and per cent distribution, by age and sex, within the Cleveland group:

TABLE I

Age at Time of Survey (Years)	Number and Per cent Distribution					
	Total	Per cent	Male	Per cent	Female	Per cent
All ages	*4,186*	*100*	*2,638*	*100*	*1,548*	*100*
Under 5	165	4	88	3	77	5
5–9	(416)		(219)		(197)	
10–14	(355)		(208)		(147)	
	771	18	427	16	344	22
15–19	301	7	169	6	132	9
20–24	(290)		(187)		(103)	
25–29	(296)		(223)		(73)	
30–34	(267)		(184)		(83)	
35–39	(299)		(218)		(81)	
40–44	(298)		(209)		(89)	
45–49	(266)		(185)		(81)	
	1,716	41	1,206	46	510	33
50–54	(274)		(191)		(83)	
55–59	(262)		(172)		(90)	
	536	13	363	14	173	11
60 and over	697	17	385	15	312	20

AGE

Considered in a little less detail, we have then twenty-two per cent under fifteen years of age; sixty-one per cent between the ages of fifteen and sixty, and seventeen per cent in the group sixty years of age and over. Unrelated to age at the occurrence of the disability, these age groups suggest problems, first, of working life, second, of youth, and third, of old age. The significance of the age distribution among the crippled is perhaps best brought out by contrasting it with that found in the blind population.

In the Federal Census of 1910 about seven per cent of the blind were found to be under the age of fifteen; about forty-four per cent between the ages of fifteen and sixty; and forty-nine per cent sixty years of age and over. Again, we have, stated numerically, the problems of old age, working life, and youth. The relative proportions of these groupings are brought out further by the following statement:

Age Distribution of the Blind

7 Per cent	44 Per cent	49 Per cent
Under fifteen years	15–60 years	60 years and over

Age Distribution of the Crippled

22 Per cent	61 Per cent	17 Per cent
Under fifteen years	15–60 years	60 years and over

SEX

The probability of a preponderance of males over females in any considerable group of crippled persons suggests itself at once, owing to greater liability of males to accidents. This is amply confirmed by our statistics (see Table 8, page 36).

The question of the distribution of the sexes is especially important apropos of questions of the employment of adults. Table 1 shows 2,638, or sixty-three per cent, males, and 1,548, or thirty-seven per cent, females in the whole group. Considering adults' working-age periods, we find the larger proportion of males holds, as there were 1,738 males (sixty-eight per cent) and 815 females (thirty-two per cent) out of a total of 2,553 crippled persons between the ages of fifteen and sixty. Among the children 515, or fifty-five per cent, were males, and 421, or forty-five per cent, females, out of a total of 936. In the old-age group we find exactly the same proportions—385, or fifty-five per cent males, and 312, or forty-five per cent, females, out of a total of 697.

COLOR AND NATIVITY

The colored have a comparatively insignificant place in the problem of Cleveland cripples, as only 110 (three per cent) are colored as against 4,076 (ninety-seven per cent) white. The nativity of the white element is socially of greater importance. Table 2 shows 2,668 (sixty-six per cent) of the white to be native born and 1,401 (thirty-four per cent) to be foreign born, proportions very similar to those in the general population. The countries of birth of the foreign born are given in Table 3.[1]

TABLE 2

Color and Nativity	Number	Per cent Distribution
Total	*4,186*	*100*
White	4,076	97
Native born	(2,668)	
Foreign born	(1,401)	
Nativity not stated	(7)	
Colored	110	3

---

[1] No less than twenty-eight per cent of the foreign-born cripples in Cleveland were of German birth and twenty-seven per cent of Austro-Hungarian birth. England, Ireland, Scotland, Canada, Italy, Poland, and Russia contribute from two to nine per cent each of the total foreign born. The proportion of foreign born of the different nationalities seems, on the whole, to be in keeping with the numerical distribution of those nationalities in the general population of Cleveland. The five per cent grouped under 'other countries' include persons born in Belgium, Bulgaria, China, Denmark, Finland, France, Greece, Holland, Norway, Roumania, Servia, Sweden, Switzerland, and Syria—Finland, Norway, and Switzerland having somewhat larger representation than the other countries in this group.

TABLE 3

Country of Birth of Foreign Born	Number	Per cent Distribution
Total	*1,401*	*100*
Austria-Hungary	374	27
Germany	384	28
England	125	9
Ireland	114	8
Scotland	29	2
Canada	62	4
Italy	86	6
Poland	63	5
Russia	90	6
Other countries	74	5

AGE AT OCCURRENCE OF DISABILITY

To learn whether the crippled condition occurs with relatively greater frequency in childhood, in early youth, or at later periods of life is the first step to understanding what needs to be done by way of prevention, education or rehabilitation of persons handicapped. The following tabular statement shows the age distribution at occurrence of disability:

TABLE 4

Age at Occurrence of Disability (years)	Number	Per cent Distribution
All ages	*4,186*	*100*
Birth– 4	1,400	34
5– 9	352	8
10–14	294	7
15–19	252	6
20–24	250	6
25–29	259	6
30–34	216	5
35–39	179	4
40–44	188	5
45–49	182	4
50–54	161	4
55–59	133	3
60 and over	273	7
Not stated	47	1

When we group the above age periods into three general divisions, it appears that 2,046, or very nearly one-half of the total number of cripples enumerated, became crippled before they were fifteen years of age; and 1,820, or forty-three per cent, became crippled during working life, that is, between the ages of fifteen and sixty; while only 273, or seven per cent, became crippled after the age of sixty years.

The significance of these percentages is brought out by contrasting them with corresponding figures for another group of the physically handicapped, the blind, as reported in the United States Census for 1910, which shows not only that about fifty per cent of the blind were over the age of sixty[2] but that more than twenty-eight per cent of the total number became blind after the age of sixty.[3] The handicap of blindness is, therefore, clearly an accompaniment of age, and the numbers of the blind steadily increase with each age-group.

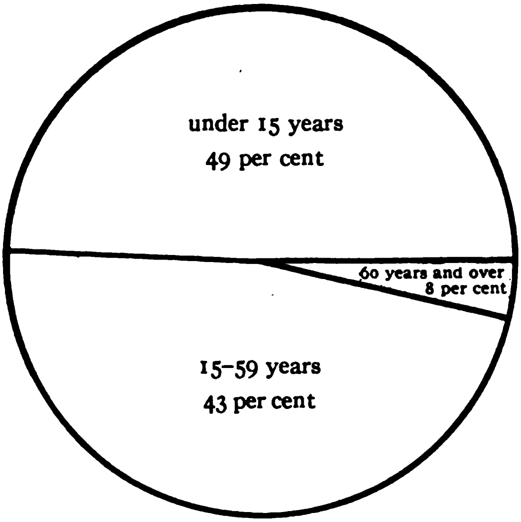
On the other hand, only seventeen per cent of cripples were sixty years of age or over at the time of survey, while forty-nine per cent became crippled while under the age of fifteen. Still more marked evidence that a crippled condition is largely an accompaniment of early childhood is found in the fact that 1,400, or thirty-four per cent, of the whole crippled population became disabled under the age of five.

Second in importance and interest is the extent to which the problem of cripples is one of working life, for not only were sixty-one per cent of the whole group between the ages of fifteen and sixty at the time of survey, but forty-three per cent of the whole group became crippled between the ages of fifteen and sixty. Numerically considered from the point of view of age at occurrence, the problem of the crippled population is, first, one of childhood, and, second, one of working life.

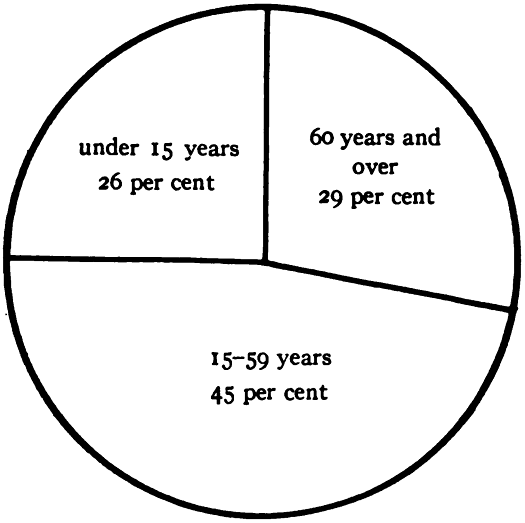
[2] See statement, page 23.

[3] See diagram, page 27.

COMPARISON OF AGE AT OCCURRENCE OF DISABILITY AMONG THE BLIND AND THE CRIPPLED



Age at Occurrence of Disability
Cleveland Cripple Survey, 1915-1916



Age at Occurrence of Blindness
1910 Census

FORM OF DISABILITY

The significance of the word *cripple* is so much less obvious than the terms used to describe those who are physically handicapped by sense-defects, *the deaf, the blind,* or those handicapped by disease, *the tubercular* and *heart-cases,* for instance, that the form of disability has to be clearly stated before the figures for the muscularly and skeletally handicapped can take on much meaning.

To suggest as briefly and simply as possible the forms of physical disability included in this study, the general classification has been limited to *loss* or *defect* of arms and legs and deformity or paralysis of body.

The following table shows the numbers and percentage distribution of these forms of disability, with the added information whether one or both legs or arms are involved, both legs and arms, or both legs and arms and body:

TABLE 5

Form of Disability	Number	Per cent Distribution
All forms	*4,186*	*100*
Loss of one hand or arm	188	4
Loss of both hands or arms	6	1—
Defect of one hand or arm	499	11
Defect of both hands or arms	42	1
Loss of one foot or leg	466	11
Loss of both feet or legs	27	1—
Defect of one foot or leg	1,546	37
Defect of both feet or legs	365	9
Loss or defect of one or both arms and one or both legs	332	7
Deformity of body	199	5
Paralysis of body	6	1—
Not classified	67	1
Disability of legs or arms or of both and of body	443	11

Grouping these figures in the five divisions finally adopted for use in the General Tables, we find that 735, or seventeen per cent, have suffered loss or defect of arms; 2,404, or fifty-eight per cent, loss or defect of legs; 332, or seven per cent, loss or defect of one or both arms and one or both legs; 272, or seven per cent, suffer from deformity or paralysis of the body; and 443, or eleven per cent, suffer from disability of arms or legs, or of both and of body.

Taking these groups in the order of numerical importance, we have, then, five problems of disability: first, of legs; second, of arms; third, of both legs and arms and of body, and, in similar proportions, fourth, those disabled in one or both arms and one or both legs; and, fifth, those suffering from defect of the body only.

In view of the range and usefulness of the activities of cripples, it was important to examine quite closely all evidence as to the degree of seriousness of physical handicaps. No cases were retained in the final count of 4,186 of the Cleveland Cripple Survey that were not from some point of view seriously handicapped, however well they might have adapted themselves and minimized the handicap. Which are the least and which are the most disabling defects is, of course, open to endless debate; but there are practical grounds for counting losses of foot or of leg below the knee as comparatively less disabling than any of the other defects enumerated. Facing page 180 may be seen the factory patrolman with artificial leg mounting his wheel. Countless instances of activity apparently unhampered by such a defect could be found, and it is to be noted that a disability of this kind often affects the gait so slightly that it may be entirely unobserved. A civilian volunteer tells of an army officer who referred to his artificial limb only by way of explaining to his neighbor why he had shown complete indifference to a splinter of shell which struck that leg.

The disability (tabulated under defect of hand or arm) involving the loss of a thumb or of two or more fingers on the left hand only may constitute largely a defect of appearance.[4] But even under these two conditions, which represent the least of the defects included in the study, there have been problems of limitation and adaptation, however well they have been overcome. Mention is made of this to show the least disabilities included among losses and defects.

Losses may be described much more readily and clearly than defects above or below a given joint, and the fact whether the loss has been replaced by artificial limbs is an additional point that may be definitely reported and considered for individual cases in relation to appearance, means of locomotion, education, occupation, etc.; but, as will appear in later discussion of occupation, it is not safe to generalize about artificial limbs. It is equally as important how they are to be used, and who is to use them, as it is to have them.

'Defect' is necessarily a vague term when employed in a descriptive record, as it must include a variety of conditions. It has already been pointed out that in two instances defect has been made to include minor losses. In 'defect of hand', for example, are included the loss of a thumb or two or more fingers, as well as congenital or acquired defects and congenital lacks. Similarly, 'defect of foot' includes corresponding losses of parts of the foot, as well as congenital or acquired defects and congenital lacks. These two types are the least important among defects which also include disabilities so great as to leave the patient bed-ridden.

Although the distinction between loss and defect is interesting and important, it cannot be regarded as any measure of the seriousness of disability. The loss of both hands or arms—happily small in number—seems a most serious handicap, yet the defect of both hands or arms may be exactly as much of a disability, or more. Again, in the group, 'loss or defect of both feet or legs', the handicap in cases where, for example, the defect is traceable to infantile paralysis may be even greater than in those where a loss occurred.

---

[4] It should be remembered however, that the significance of any handicap varies with occupation. This one, for example, would be fatal to the ordinary occupation of pianist.

Taking losses and defects together, then, and considering for the moment only the part of the anatomy affected, less than two per cent of all the cases suffered from disability of both hands or arms, and ten per cent suffered from disability of both feet or legs. The loss or defect of both legs, if the disability extends above the knee, involves the use of crutches, wheel chair, or other motor device by persons included in this group. Relating losses and defects of a single hand or arm in the same way, it is shown that fifteen per cent suffered disability of a hand or arm, and forty-eight per cent disability of a foot or leg. The last-mentioned group includes many who make use of a cane, or brace, and a few who make use of a crutch.

In the group of 332 (seven per cent of the total) described as being handicapped by the loss or defect of one or both arms and one or both legs are included not only a large proportion of cases in which one side only is affected but also those totally disabled in the use of both arms and legs. This group contains persons using canes, braces, crutches, and a few using wheel chairs.

It was perhaps unnecessary to maintain the distinctions noted within the group affected as to the body only. As a whole, they represent a group of people with unimpaired use of limbs, but usually of limited strength as a result of spinal conditions and varying degrees of deformity. It includes a few who wear braces.

The 443 cases (eleven per cent of the total) suffering disability of arms or legs or of both and of body obviously represent a heavily handicapped group. The distinction between those who suffer from 'loss or defect of one or both arms and one or both legs' and those who suffer from 'disability of arms or legs or of both and of body' is probably to some extent inaccurate because the records are not always clear on these points, but both groups unquestionably represent serious disabilities. These two groups include many who use wheel chairs and all who are bed-ridden as a result of a crippled condition. It is to be remembered that there are cripples who are bed-ridden from causes other than those creating their crippled condition.

It is important, particularly with reference to the question of special education or training, to get some impression of disabilities in relation to present age. Certain forms of disability are confined more largely to one age group than to another, and the tabular statement on the following page brings out several points of interest in this connection.

Since, as already intimated, accidents are such a prolific cause of a crippled condition, it is in keeping with the expected that persons suffering from losses of limbs should be found largely in the adult groups. Of a total of 194 who had lost one or both hands or arms three per cent were under twenty years of age; and of the 188 over twenty who have lost hand or arm sixty-six per cent were between the ages of twenty and forty-nine. Furthermore, of the 493 persons having lost one or both feet or legs, only twelve per cent were under the age of twenty, while eighty-eight per cent were adults.

When the question is of a disability due to some defect, the age distribution is quite different. Thus, out of a total of 1911 with defects of one or both feet or legs, thirty per cent were under fifteen years of age; of the 332 with

TABLE 6

Form of Disability	Age at Time of Survey (years)													
	Number							Per cent Distribution						
	Total	Under 5	5–14	15–19	20–49	50–59	60 and over	Total	Under 5	5–14	15–19	20–49	50–59	60 and over
All forms	*4,186*	*165*	*771*	*301*	*1,716*	*536*	*697*	*100*	*4*	*18*	*7*	*41*	*13*	*17*
Loss of one or both hands or arms	194	0	4	2	128	39	21	100	0	2	1	66	20	11
Defect of one or both hands or arms	541	24	60	29	301	72	55	100	5	11	5	56	13	10
Loss of one or both feet or legs	493	0	32	23	308	70	60	100	0	7	5	62	14	12
Defect of one or both feet or legs	1,911	104	454	162	637	236	318	100	6	24	8	33	12	17
Loss or defect of one or both arms and one or both legs	332	10	69	15	107	45	86	100	3	21	4	32	14	26
Deformity of body Paralysis of body Both not classified	272	5	99	42	95	11	20	100	2	36	16	35	4	7
Disability of arms and legs or of both and of body	443	22	53	28	140	63	137	100	5	12	6	32	14	31

TABLE 7

Form of Disability	Age at Occurrence (years)															
	Number								Per cent Distribution							
	Total	Under 5	5–14	15–19	20–49	50–59	60 and over	Not Stated	Total	Under 5	5–14	15–19	20–49	50–59	60 and over	Not Stated
All forms	*4,186*	*1,400*	*646*	*252*	*1,274*	*294*	*273*	*47*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
Loss of hand or arm																
One	188	5	24	34	112	10	3		4	1−	3	13	9	3	1	
Both	6			1	4	1			1−			1−	1−	1−		
Defect of hand or arm																
One	499	101	63	68	223	29	10	5	12	7	10	27	17	10	3	11
Both	42	15	3	2	14	6	2		1	1	1−	1−	1	2	1−	
Loss of foot or leg																
One	466	19	114	53	244	19	16	1	11	1	18	21	19	6	6	2
Both	27	1	4	1	19		1	1	1−	1−	1−	1−	1		1−	2
Defect of foot or leg																
One	1,546	706	274	62	292	98	98	16	37	50	42	24	23	33	36	34
Both	365	163	26	7	84	39	40	6	8	11	4	2	6	13	14	13
Loss or defect of one or both arms and of one or both legs	332	115	24	5	103	33	51	1	8	8	4	2	8	11	18	2
Deformity of body	199	122	52	3	10	2	5	5	5	9	8	1−	1−	1−	2	11
Paralysis of body	6	1		1	3	1			1−	1−		1−	1−	1−		
Not classified	67	20	29	1	13	1	1	2	1	1	4	1−	1	1−	1−	4
Disability of arms or legs or of both and of body	443	132	33	14	153	55	46	10	10	9	5	5	12	18	17	21

loss or defect of one or both arms and one or both legs, twenty-four per cent were under fifteen; of persons with deformed bodies thirty-eight per cent were under fifteen; and in the group of persons suffering disability of both arms and legs or of both and of body seventeen per cent out of a total of 443 were under fifteen years of age.

No less important than the present age distribution of crippled persons is the relation between their form of disability and the age at which it occurred as it bears on the question of prevention. Both losses and defects of hand and arm occur, as we have already inferred, largely during the period of industrial life; so also do losses of foot or leg. Defects of foot or leg, on the other hand, show a high rate of occurrence in infancy as well as in industrial life.

Thus, of the 1911 disabilities of this kind 869, or forty-five per cent, took place under the age of five. These and other details are outlined in the tabular statement on the preceding page.

MAIN CAUSES OF DISABILITY

In a non-medical study an intimate analysis of the various causes of muscular and skeletal defects would be out of place. But a broad outline of main causes pictures conditions sufficiently for our purposes and hints at preventive possibilities. With the exception of children's cases the classification of causes has been restricted to four general divisions, as shown in the following tabular statement.

TABLE 8

Main Causes of Disability	Number			Per cent Distribution		
	Total	Male	Female	Total	Male	Female
All causes	*4,186*	*2,638*	*1,548*	*100*	*100*	*100*
Congenital	301	136	165	7	5	11
Accident at occupation	468	457	11	11	17	1 —
Other accident	1,323	966	357	32	37	23
Infantile paralysis	525	289	236	13	11	15
Other diseases	1,437	724	713	34	28	46
Not stated	132	66	66	3	2	4

To summarize: 301, or seven per cent, of the disabilities were due to congenital causes; 1,791, or forty-three per cent, to accident; 1,962, or forty-seven per cent, to disease, and in 132 cases, or three per cent, the cause was not learned.

Under Congenital are grouped those persons 'cheated of feature by dissembling nature', who, unless their disability can be surgically relieved, must live their lives from start to finish so handicapped. Individual cases among the congenitally defective indicate that even in a city with abundant surgical skill congenital abnormalities do not always come to medical attention or may fail entirely of treatment. This is chiefly true of adults with such defects as club hands and feet. It is possible, of course, that at the time suitable for treatment such cases had no access to medical service, or that the family accepted the congenital condition as hopeless, and without medical opinion it would be impossible to make sure the cases could ever have been helped. But it is clear that some congenital defectives have not had a chance and have grown up without benefit of medical service. There were found thirty-eight cases of crippled children who had not received medical care; they were largely congenital cases. Some were mentally defective, and others non-congenital cases in which the family accepted the condition as inevitable.

A 'steeple-jack' who sticks to his job after losing his left arm below the elbow at the age of forty

MU

That among the main causes of crippled conditions accident is a close second to disease has the greatest significance. It accounts for twenty-four per cent of all disabilities among females and fifty-four per cent of all disabilities among males. The distinction between 'accident at occupation' and 'other accident' does not give a wholly correct impression, and may be disregarded for practical purposes. It has been maintained because at least one-fourth of all cripples from accident attribute their condition to accident at occupation. In most of these cases the question is fairly settled by the corroborative facts of compensation or re-employment, or both. In many cases, however, that were reported merely as involving accident and, therefore, classified as such, especially when it was of long standing, the general evidence of the schedule raises a question whether it was accident at occupation, but leaves the matter in doubt. This is especially true of railroad accidents and other accidents of transportation.

The tremendous thing about accident as a cause is that it has been responsible for forty-three per cent of Cleveland cripples, and that it is impossible not to believe it to be preventable. Of course, many of the accidents under view happened long ago, and the effects of legislative regulation of employers' liability and workmen's compensation without doubt tend to reduce industrial accidents; but even so, with this large proportion of possibly preventable causes, it is not enough to settle down to problems of rehabilitating the crippled. Preventive work must be given a first place.

The proportion of *infantile paralysis* cases shows this disease to be the cause of disability in more than a fourth of the whole number crippled by disease. But it is clearly too low for the adult groups, for when the disease brought on disability in early childhood, the statement of cause is often not convincing, and no attempt has been made to secure confirmed medical diagnosis in such instances. It is impossible, however, to suggest how large or small a factor among adults unrecognized infantile paralysis may have been, for while the total number of cases in which the cause of crippled condition is 'not stated' is relatively small, the number under 'other diseases' is very large.

The statistics of causes among children, on the other hand, are not open to this uncertainty; and one of the most substantial and satisfactory results of the whole study is the statement of main causes of disability among crippled children. Since the disabilities in this group were of comparatively recent date, it was possible, with the co-operation of parents, physicians, clinics and hospitals, to secure a confirmed medical diagnosis in fifty-eight per cent of all cases and in seventy-one per cent of all cases of disease (not counting those with congenital defects). The following tabular statement shows separately for children the causes of their disability and the sources of knowledge about them:

TABLE 9

Causes Among Children	Total	Per cent	Confirmed Medical Diagnosis	Statement of Family	Not Stated
All causes	*936*	*100*	*548*	*357*	*31*
Congenital	149	16	67	82	0
Accident	87	9	2	85	0
Infantile paralysis	382	41	250	132	0
Tubercular bones and joints	139	15	130	9	0
Other diseases[5]	148	16	99	49	0
Not classified	31	3	0	0	31

---

[5] Other diseases in order of frequency of occurrence were spastic paraplegia, scoliosis, osteomyelitis, paralysis (obstetrical and other), spinal meningitis, rachitis, spinabifida with hydrocephalus, and unclassified diseases.

The fact stands out that about an eighth of Cleveland's whole population of cripples have been made such by *infantile paralysis*, and that forty-one per cent of its population of crippled children are known to be the victims of this havoc-making disease. It is to be remembered, both that cripples represent only the survivors of disease, and that Cleveland has not had recognized epidemics of infantile paralysis. The damage to be expected in case of an epidemic of infantile paralysis is, therefore, very great. Under average conditions it is great enough to stimulate preventive efforts, and it presents a yearly problem of after-care.

An analysis of 382 cases of infantile paralysis among crippled children under fifteen, by years of occurrence, shows that an average of twenty-seven crippled children a year were added to the group from this one cause during the past fourteen years. The greatest numbers of crippled survivors of any given years are forty-three from the 1911 group, sixty from 1912, and seventy-four from 1915. A statement covering this point follows:

382 Cases of Children Crippled by Infantile Paralysis, by Years of Occurrence and Sex

Year of Occurrence	Total	Male	Female
1903	11	6	5
1904	7	5	2
1905	19	10	9
1906	10	8	2
1907	13	8	5
1908	10	4	6
1909	24	12	12
1910	28	17	11
1911	43	20	23
1912	60	31	29
1913	39	19	20
1914	32	14	18
1915	74	39	35
1916	12	7	5

TABLE 10

Main Causes of Disability	Age at Time of Survey (Years)													
	Number							Per cent Distribution						
	Total	Under 5	5–14	15–19	20–49	50–59	60 and over	Total	Under 5	5–14	15–19	20–49	50–59	60 and over
Male	*2,638*	*88*	*427*	*169*	*1,206*	*363*	*385*	*100*	*3*	*16*	*6*	*46*	*14*	*15*
Congenital	136	21	55	12	35	5	8	100	15	40	9	26	4	6
Accident at occupation	457			9	299	91	58	100			2	65	20	13
Other accident	966	2	63	63	534	153	151	100	1–	6	6	55	16	16
Infantile paralysis	289	54	149	25	60	1		100	19	51	8	21	1–	
Other disease	724	11	146	51	246	106	164	100	1	20	7	34	15	23
Not stated	66		14	9	32	7	4	100		21	14	48	11	6
Female	*1,548*	*77*	*344*	*132*	*510*	*173*	*312*	*100*	*5*	*22*	*9*	*33*	*11*	*20*
Congenital	165	10	63	27	53	10	2	100	6	38	17	32	6	1
Accident at occupation	11				10		1	100				91		9
Other accident	357	1	21	23	145	55	112	100	1–	6	6	41	15	31
Infantile paralysis	236	51	128	20	32	2	3	100	22	54	8	14	1–	1
Other disease	713	12	118	53	249	94	187	100	2	17	7	35	13	26
Not stated	66	3	14	9	21	12	7	100	4	21	14	32	18	11

The second main cause of crippled conditions in children, tubercular bones and joints, is also one with well-known chances of improvement under after-care. It is responsible for fifteen per cent of the crippled among Cleveland children, with medically confirmed diagnosis in almost all cases.

These two major causes, infantile paralysis and tubercular bones and joints, account for fifty-six per cent of all cases of crippled children, and both are well known to be subject to relief and improvement by after-care of precisely the right kind.

An examination of causes of disability in the group of 110 crippled children attending the special classes at the Willson School (children who would not be received in the regular classes) shows that sixty-six of the number became crippled from the two above-mentioned causes alone—forty-three from infantile paralysis and twenty-three from tubercular bones and joints. The fact is of importance in planning for the care and education of such children.

Consideration of all causes in relation to present age offers certain bits of added evidence on the subject. That the numbers of the congenitally handicapped who live beyond fifty is not large is, for example, suggested by the steadily decreasing numbers of cripples from congenital causes in the age-groups after that period. Of 301 crippled by congenital causes, only 10 are sixty years of age and over; 15 are between the ages of fifty and fifty-nine. The total over fifty is, therefore, 25, while we have 88 between twenty and fifty, and 188 under twenty. These details by sexes are to be found with other facts in the preceding tabular statement.

Certain forms of disability, especially losses, and the age of their occurrence find their natural explanation in causes. Losses occur largely among adults in the industrial period because the accidents to which losses are due occur largely during working life. These facts, among others, are emphasized in the following tabular statement of main causes of disability in relation to age at occurrence, given by sex:

TABLE II

Main Causes of Disability	Age at Occurrence (Years)															
	Number								Per cent Distribution							
	Total	Under 5	5–14	15–19	20–49	50–59	60 and over	Not Stated	Total	Under 5	5–14	15–19	20–49	50–59	60 and over	Not Stated
Male	*2,638*	*720*	*424*	*217*	*952*	*180*	*117*	*28*	*100*	*28*	*16*	*8*	*36*	*7*	*4*	*1*
Congenital	136	136							100	100						
Accident at occupation	457		12	66	333	37	7	2	100		3	14	73	8	1	1−
Other accident	966	91	252	108	401	68	38	8	100	9	26	11	42	7	4	1−
Infantile paralysis	289	259	24	2	2			2	100	89	8	1−	1−			1−
Other disease	724	204	123	34	204	74	70	15	100	28	17	5	28	10	10	2
Not classified	66	30	13	7	12	1	2	1	100	45	20	10	18	2	3	2
Female	*1,548*	*680*	*222*	*35*	*322*	*114*	*156*	*19*	*100*	*44*	*14*	*2*	*21*	*8*	*10*	*1*
Congenital	165	165							100	100						
Accident at occupation	11		2	5	4				100		18	46	36			
Other accident	357	85	64	13	86	41	67	1	100	24	18	4	24	11	18	1−
Infantile paralysis	236	210	25	1					100	89	10	1−				
Other disease	713	185	121	15	221	68	87	16	100	26	17	2	31	10	12	2
Not classified	66	35	10	1	11	5	2	2	100	53	15	1	17	8	3	3

SCHOOLING

The schooling of crippled children is complicated in different ways. Much depends upon the particular cause of disability and the need for long periods of after-care under medical supervision. Then there are the mechanical difficulties resulting from certain crippled conditions, and, not least, questions of general health and mentality.

The following tabular statement shows the main facts of school attendance for crippled children of school age:

TABLE 12

School Attendance	Number	Per cent Distribution
Total	*771*	*100*
At public school	525	68
Regular classes 415 (79 per cent)		
Special classes 110 (21 per cent)		
Not at school	246	32

Of the total of 936 crippled children under fifteen years of age, 165, or seventeen per cent, were under five years of age, and 771 were between the ages of five and fifteen at time of survey. Of this number 525, or sixty-eight per cent, were at school—415 in regular classes of the public schools, and 110 in the special classes for crippled children maintained at the Willson School—while 246, or thirty-two per cent, of all children of school age, were not at school.

The number attending regular classes in the public school is reassuring, but the group should not be passed by as necessarily provided for in a wholly adequate manner. The entire group of 936 crippled children deserves, without doubt, closer study than the single visits of the Survey would permit,[6] and even for this more fortunate group of

---

[6] Of 936 children, 491 were reported by the visitors as in *comfortable* homes, 340 in *poor* homes, and 94 in *very poor* homes.

415, receiving education in the usual way, it must be assumed, knowing the causes of their disabilities, that some would be helped by a period of special care and that the majority need the right kind of vocational guidance. The fact of their admission to regular classes is a proof that their condition does not involve the mechanical difficulties of locomotion or transportation that send children to the special classes for cripples rather than that they have no need of after-care or of special vocational guidance.

It is worth while in this connection to consider the form of disability in its relation to schooling. All the evidence goes to show that the form of disability does not of itself determine the fitness or unfitness of the child for schooling, nor does it wholly determine the form of schooling given crippled children already at school. In the following tabular statement the forms of disability of all children of school age are given in detail, so that the groups in regular classes, special classes, and not at school may be compared:

TABLE 13

Form of Disability	School Attendance			
	Total	Regular Classes	Special Classes	Not at School
All forms	*771*	*415*	*110*	*246*
Loss of right hand	1	1		
Loss of right arm				
Below elbow				
Above elbow	1	1		
Defect of right hand	11	7	1	3
Defect of right arm	12	9	1	2
Loss of left hand	1	1		
Loss of left arm				
Below elbow	1	1		
Above elbow				
Defect of left hand	12	11		1

TABLE 13 (*Continued*)

Form of Disability	School Attendance			
	Total	Regular Classes	Special Classes	Not at School
Defect of left arm	18	15		3
Loss of both hands				
Loss of both arms				
Defect of both hands	5	4	1	
Defect of both arms	3	2		1
Loss of foot	8	7	1	
Loss of leg				
Below knee	10	9	1	
Above knee	12	8	1	3
Defect of foot	44	26	4	14
Defect of leg	324	198	36	90
Loss of both feet				
Loss of both legs				
Defect of both feet	10	8	1	1
Defect of both legs	78	13	24	41
Loss or defect of one or both arms and one or both legs	68	36	12	20
Deformity of body	68	34	11	23
Paralysis of body	1			1
Not classified	30	12	5	13
Disability of arms or legs or of both and of body	53	12	11	30

The preceding table does not bring out the fact, which is made clear by closer acquaintance with the group, that individual difficulties of locomotion and the general problem of transportation largely determine the admission of children to the special classes. A difference in degree of disability in this matter of locomotion usually settles whether children with the same form of handicap attend regular or special classes. At the same time it is evident that children of the same disability-group are to be found in 'regular classes', in 'special classes', and also among those 'not at school'. Of sixty-eight children of school age with deformity of body, for example, thirty-four are in regular classes, eleven in the special classes, and twenty-three are at home. Of seventy-eight children with defect of both legs, thirteen are in regular classes, twenty-four in special classes, and forty-one at home.

It is, therefore, of direct importance to learn why the 246 children of school age are not in school, of whom no less than 105 are of *compulsory* school age. The reasons are set forth in the tabular statement on the following page.

No less than thirty-nine of the 105 children staying at home, although of compulsory school age, were under treatment at the time of visit. The fact emphasizes the need of a plan by which children may receive medical care and education, if possible, at the same time.

Out of twenty-one children reported as feeble-minded the diagnosis had been officially confirmed in sixteen cases. Leaving out of consideration the seven additional cases of children reported to be of doubtful mentality, nineteen per cent of one hundred and five children of compulsory school age and not in school are recognized as feeble-minded.

The number of children of compulsory school age at home represents, however, a small proportion of the crippled children, and the question of mentality of the whole group of 936 needs to be considered. Taking all cases in which mentality is questioned, as well as the cases of officially diagnosed feeble-mindedness for the whole group of children, both those of school age and those under five, the total is seventy-six, or eight per cent. The figures approach those reported in Mr. McMurtrie's digest of the Biesalski study of crippled children under fifteen in Germany,[7] which notes that eighty-eight and six-tenths

---

[7] *American Journal of Care for Cripples*, Vol. 1, No. 3, p. 119.

Crippled Children not Attending School

Number of Children	Age at Time of Survey	Reasons for not attending School
246		
82	5	Under compulsory school age
59	6	Under compulsory school age
27	7	8 under medical treatment at time of visit 5 feeble-minded (4 confirmed diagnosis) 3 unable to walk (bed or wheel chair cases) 1 went to school for short time, but was taken out because of illness; mother uninformed about Cripple School 2 expected to go following year 8 no definite reason given; most of them had just reached seven years of age
20	8	10 under treatment at time of visit 2 feeble-minded (confirmed diagnosis) 4 question of mentality (1 dumb) 2 unable to walk 1 went to Cripple School, but mother considered crossing street too dangerous 1 no reason given by parent
10	9	1 under treatment at time of visit 1 feeble-minded (confirmed diagnosis) 2 found it too difficult to learn 3 in institution 1 uses crutches and braces and cannot walk any distance 2 unable to walk
17	10	10 under treatment 3 feeble-minded (confirmed diagnosis) 1 cannot walk and talk 2 cannot walk 1 no reason given by parent
8	11	4 under treatment 2 cannot walk 1 feeble-minded (confirmed diagnosis) 1 found it too much of a physical strain
9	12	2 under treatment 2 had been to school but did not return because of illness 4 feeble-minded (3 confirmed diagnosis) 1 question of pulmonary tuberculosis
5	13	1 under treatment 2 feeble-minded (1 confirmed diagnosis) 1 nervous strain too great 1 no reason given
9	14	3 under treatment 3 feeble-minded (1 confirmed diagnosis) 2 cannot walk 1 in institution

per cent of crippled children in that country were reported as of sound mind, eight and five-tenths per cent as mentally defective, and two and nine-tenths per cent inclined to viciousness and crime. It may also be mentioned in contrast that in a study of the obviously feebleminded among the young blind of Massachusetts, fifteen per cent were classified as such.[8]

In brief, mentality and general health, as well as aftercare following certain major causes, are just as much to be considered in relation to the schooling of crippled children as the form of disability and the mechanical difficulties resulting therefrom.

DEGREE OF EDUCATION

In the whole group of cripples 347 under nine years of age were not attending school, or eight per cent of the whole number. The illiterates among persons over ten years of age numbered 282, or seven per cent. A large proportion of cripples, 3,114, or seventy-four per cent, have had a common-school education or are receiving it. There were 615 still attending school, and 872 had received their schooling in foreign countries. The group that has reached high school numbers 238, or six per cent of the whole, but only 79 completed the course, and 43 are 'still attending'. The college group totals 43, and includes 20 who completed their course. Twelve persons attended professional schools. A considerable number, 150, have attended 'schools not classified', and some of these suggest interesting possibilities for cripples. They include business colleges and various kinds of correspondence schools, not designed for the purpose but in many ways adapted to the needs of people suffering from motor handicaps.

---

[8] *Massachusetts Commission for the Blind*, Annual Report, 1912.

The business colleges fit for occupations requiring little muscular exertion and the correspondence schools open up the possibility of home study. The following statement presents in statistical form the degree of education of cripples enumerated in the Survey:

TABLE 14

Degree of Education	Number	Per cent Distribution
All degrees	*4,186*	*100*
Not attending school (under nine years)	347	8
Illiterate (10–60 +)	282	7
Common school	3,114	74
In United States	(1,627)	
Foreign countries	(872)	
Still attending	(615)	
High school	238	6
Completed	(79)	
Not completed	(116)	
Still attending	(43)	
College	43	1
Completed	(20)	
Not completed	(20)	
Still attending	(3)	
Attended		
Professional schools	12	1 —
Schools not classified[a]	150	3

OCCUPATION

One of the most gratifying and largely unexpected results of the Survey is its disclosure of the large proportion of cripples who are at work in some gainful occupation. Of the 3,250 persons over fifteen years of age fifty-nine per cent were employed, and they include persons with every type of physical disability recorded. The following table shows the numbers at work and the form of their disability:

---

[a] Schools not classified include business college, correspondence, technical, and other schools.

TABLE 15

Form of Disability	Number	
	At Work	Not at Work
Total	*1,912*	*1,338*
Loss of hand or arm		
One	147	37
Both	3	2
Defect of hand or arm		
One	341	86
Both	20	15
Loss of foot or leg		
One	314	115
Both	14	13
Defect of foot or leg		
One	721	389
Both	81	165
Loss or defect of one or both arms and of one or both legs	76	174
Deformity of body	73	53
Paralysis of body	3	2
Not classified	10	27
Disability of arms or legs or of both and of body	109	260

Three groups stand out here with a large proportion of unemployed: those having a defect of both feet or legs, those having loss or defect of one or both arms and one or both legs, and those having disability of arms or legs or of both and of body. These forms of disability are in themselves without doubt among the heaviest physical handicaps under consideration. A close study of causes in relation to form of disability would probably show, too, that the causes of these disabilities are many times of a kind that result in poor general condition as well as muscular or skeletal defect. It is also to be remembered that these are the forms of handicap requiring the use of special appliances, crutches, wheel chair, etc., that are themselves complications in finding employment. Other things being equal we have here, without doubt, even after adequate training a large part of the group requiring not only placement at selected trades and processes but special conditions of work.

Even under very general classifications of occupations, the crippled persons at work follow a variety of occupations, as may be gathered from the next tabular statement:

TABLE 16

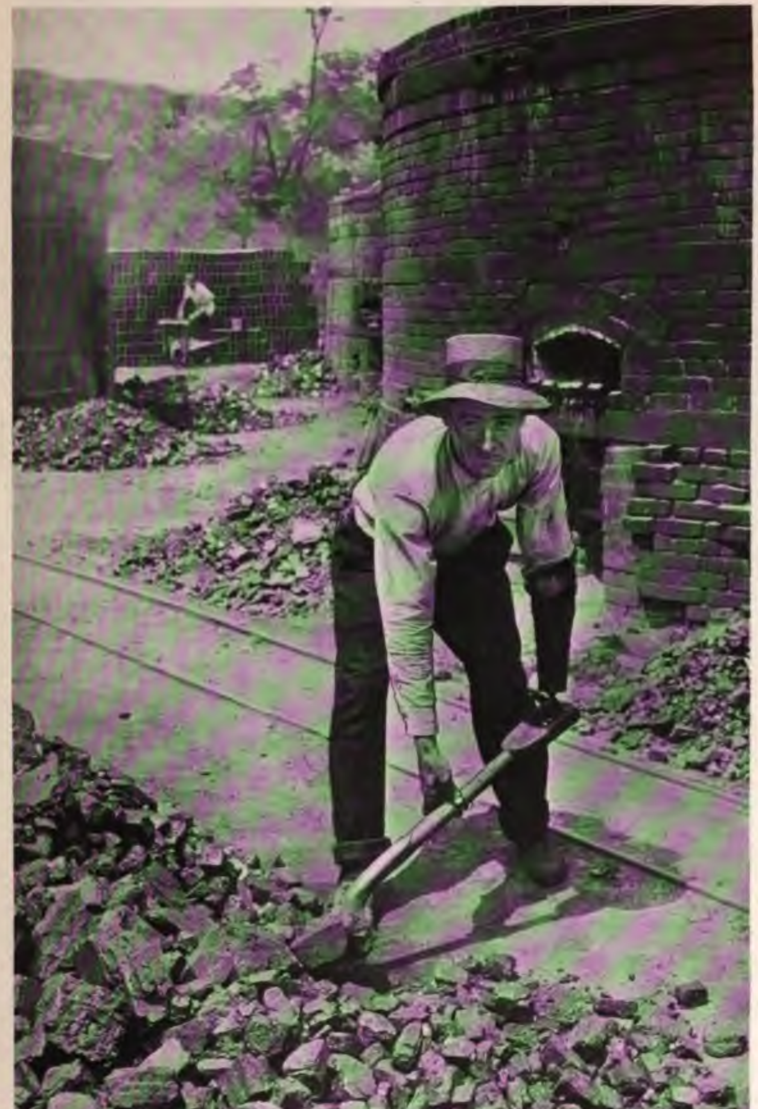
Occupation	Number		Per cent Distribution	
	Male	Female	Male	Female
Total	*1,319*	*593*	*100*	*100*
Manufacturing and mechanical industries	651	77	49	13
Transportation	192	10	15	2
Trade	201	24	15	4
Public service	65	1	5	1—
Professional service	45	16	3	3
Domestic and personal service	80	44	6	7
Clerical occupations	49	21	4	3
Not classified	36		3	—
Housewives		400	—	67

The earning capacity of the cripples at work is brought out in Table 17. That in a considerable number of cases the earnings are not stated is explained by the fact that 400 active housewives were included, that the worker in question very frequently is either owner or manager of his own business and does not care to state his earnings, or that the occupation yields variable returns. The lack of exact information on this point is oftener an evidence of high than of low earning capacity.

TABLE 17

Weekly Wage	Crippled Persons over Fifteen Years of Age			
	Number	Per cent	Male	Female
Total	*1,912*	*100*	*1,319*	*593*
Under $6	87	4	36	51
$6–$10	180	9	127	53
$10–$15	383	20	351	32
$15–$20	350	18	340	10
$20–$25	107	6	103	4
$25–$30	62	3	61	1
$30–$35	28	1	28	0
$35–$40	9	1–	9	0
$40–$45	7	1–	3	4
$45–$50	3	1–	3	0
Not stated	696	36	258	438

The list below brings into clear view the variety of occupations and the small number engaged in any one skilled occupation. The large groups in each instance represent with few exceptions unskilled workmen, either watchmen, laborers, elevator men, etc., or work which is eventually dependent upon mind rather than muscle, such as that of clerks, salesmen, foremen, proprietors. The exceptions (carpenters, painters, etc.) are to be explained in various ways and mean almost invariably a trade mastered before disability occurred, and either that at least one good arm, be it right or left, remains to work



Successful laborer with hook appliance

MU

with or that the disability is of the less handicapping kind, such as defect of the lower limbs. In every instance the explanation rests upon what is left rather than what is gone.

Occupations followed by Four or More Men among Cleveland Cripples at Work, including all Forms of Handicap[10]

Agent	6
Assembler	10
Barber	7
Bartender	7
Bench-hand	4
Bookkeeper	13
Bridge-captain or engineer	5
Carpenter	24
Chauffeur	14
Cigar-maker	8
Clerk	35
Core-maker	10
Crane-hand	6
Delivery-man	9
Die-maker	6
Draftsman	7
Drill-press operator	12
Driver	4
Employer	13
Elevator-man	39
Errand-boy	5
Finisher	7
Fireman	5
Foreman	22
Grinder	6
Handy-man	6
Helper	11
Inspector	9
Janitor	17
Laborer	67
Lathe-hand	15
Manager	5
Machinist	11
Machine-hand	4
Moulderer	10
Operator (moving-picture machine, etc.)	17
Packer	4
Painter	21
Pattern-maker	5
Peddler	6
Planer	3
Porter	5
Printer	5
Proprietor	36
Punch-press hand	7
Repairman	24
Salesman	18
Sorter	6
Stationary engineer	8
Stock-room hand	4
Street-trade	15
Superintendent	7
Switchman	5
Tailor	17
Teamster	21
Telephone operator	5
Timekeeper	9
Tool-maker	5
Watchman	25
Weigher	6

---

[10] For occupation lists in relation to form of disability, see pages 112–127.

A list like the above has comparatively little meaning, however, unless related to other details; and in order that each reader may observe for himself, the occupations of all crippled persons, men and women separately, at work at time of survey and over fifteen years of age are enumerated, together with the form of their handicap (see page 112). The information is valuable in demonstrating beyond question the variety of the aptitudes of crippled persons and in showing that the form of disability is only one factor in determining occupation, which frequently appears to have little or no relation to the working ability of the individual, when it is offset by other qualities. The most striking illustration of this point in the Survey is to be found in the three men in Cleveland who had lost both arms above the elbow. One of these is a street beggar, the second makes a small living at peddling from a wagon and guides his horse by keeping the reins about his own neck and shoulders, the third is a judge in the municipal court who took his bar examinations writing with the pencil held between his teeth. His story and picture are, with his kind permission, reproduced here (facing page 164).

The facts of occupation in relation to the form of handicap appear in the tabular statement on the following page and require no special comment.

To make clearer the relatively minor importance to which many have reduced handicap in their careers, studies are added briefly outlining the stories of individual cripples (see pages 128–159). To illustrate that other conditions than physical handicap are to be taken into consideration in the case of men *not at work*, as well as of those who are *at work*, two studies are appended at this point showing different men with the same handicap *at work* and *not at work* (see pages 56 and 57–58).

TABLE 18

Occupation and Sex	Total	Loss of Hand or Arm		Defect of Hand or Arm		Loss of Foot or Leg		Defect of Foot or Leg		Loss or Defect of One or Both Arms and One or Both Legs	Deformity of Body	Paralysis of Body	Not Classified	Disability of Arms or Legs or of Both and of Body
		One	Both	One	Both	One	Both	One	Both					
Male	*1,319*	*136*	*3*	*303*	*13*	*287*	*12*	*401*	*41*	*31*	*28*	*2*	*7*	*55*
Manufacturing and mechanical industries	651	57	1	181	7	123	4	203	21	11	13	2	1	27
Transportation	192	23	0	47	2	62	1	45	4	4	2	0	0	2
Trade	201	26	1	35	1	38	0	64	8	6	5	0	2	15
Public service	65	8	0	15	1	18	0	17	2	0	2	0	0	2
Professional service	45	5	0	3	0	10	3	17	1	1	2	0	1	2
Domestic and personal service	80	8	0	8	1	21	1	30	2	2	2	0	2	3
Clerical occupation	49	5	0	7	0	12	0	19	0	3	1	0	1	1
Not classified	36	4	1	7	1	3	3	6	3	4	1	0	0	3
Female	*593*	*11*	*0*	*38*	*7*	*27*	*2*	*320*	*40*	*45*	*45*	*1*	*3*	*54*
Manufacturing and mechanical industries	77	1	0	3	0	2	1	41	4	2	15	0	1	7
Transportation	10	0	0	0	0	1	0	7	0	0	2	0	0	0
Trade	24	0	0	1	1	2	0	12	0	2	3	0	0	3
Public service	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Professional service	16	0	0	0	0	0	0	13	3	0	0	0	0	0
Domestic and personal service	44	0	0	4	0	0	0	21	6	3	3	0	0	7
Clerical occupation	21	0	0	2	0	1	0	15	1	0	1	0	0	1
Not classified	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Housewives	400	10	0	28	6	21	1	210	26	38	21	1	2	36

Unemployed Males 15–60 Years, Crippled by Loss of Right Arm Above Elbow

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Cause of Disability	Artificial Arm	Occupation before Disability	More than one Handicap	Mental Condition	Personal Attitude and Habits	Reasons for Unemployment Length of Time
1,940	26	25	Accident	No	Painter of rails for railroad (stationary fireman, unskilled)	No	Normal	Ambitious	Still under treatment, expects to return to former employer, but not to same job. Has been promised job in store-room at former wages; cannot speak English
1,680	29	21	Accident	No	Laborer in factory	No	Normal	Lacks push and seems unhappy	Thinks he cannot get job because of handicap and because he cannot speak English. Latter is chief reason for being out of work three years. Does housework for uncle's family because of aunt's illness, apparently convenient arrangement for family
2,411	37	37	Accident	Not stated	Foreman and estimator of carpentry, 12 years	No	Normal	Ambitious	Accident month ago, too recent to state man's ability to return to work, is hoping to return to same type of work with probably less pay
2,419	37	29	Accident	Not stated	Foreman in stockroom, 4 years. Inspector of City sidewalks 2 years. Drop-forge man 2 years	No	Normal	Ambitious, has worked hard always	Has not had steady work for two years. Employers won't give him chance because of handicap. Has taught himself to write with left hand
2,335	45	45	Disease	Not stated	Decorator, 25 years	Not stated	Normal	Ambitious	Accident two months ago; is hoping to return to some kind of work, either as watchman or possibly to start in business for himself
3,682	58	23	Accident	No	Cabinet-maker, foreman in planing mill	Bright's Disease	Normal	Ambitious	Man has been out of work many years because of ill-health. Had saloon for years after accident though he disliked type of business; seemed only opening. Has learned to write with left hand
2,344	59	51	Accident	Not stated	Teamster	No	Normal	Lazy and alcoholic	No reason given for unemployment

Occupation of Thirty-one Males from 15–60 Years of Age, Crippled by Loss of Right Arm Above the Elbow

Case Number	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Wage
			Before	Since	
2,892	37	7	None	Bookkeeper, 14 years	$70.00 month
1,710	26	21	Laborer (laundry), $2.00 day	Elevator operator (2 years, 8 months)	$1.45 day
590	25	15	None	Elevator operator	$10.00 week
2,213	55	41	Fireman, 40c. hour	Fireman, 14 years	40c. hour
2,670	50	26	Railroad employee	1. Timekeeper 2. Foreman, railroad, 11 years	$1,800 year
3,549	51	14	Employee (barrel factory)	1. Newspaper route 2. Messenger boy 3. Elevator man 4. Watchman 5. Storekeeper 6. Locksmith, 9 years	$15.00 week
637	24	23	Not stated	Insurance agent	$3.00–$5.00 week
2,732	45	9	None	1. Telegrapher 2. Janitor, 5 years	$30.00–$40.00 month
1,602	26	26	Repairing freight cars ($20 week)	Laborer (iron foundry), 15 days	25c. hour
2,172	56	53	Drill operator	Laborer (hydraulic press), 5 months	$2.00 day
3,651	37	13	None	Laborer (sash and door factory), 4 years	$12.50 week.
1,645	33	27	Salesman and Demonstrator (Vacuum Cleaner Factory, $60.00 week)	1. Salesman 2. Elevator man 3. Choreman 4. Partner (electrical business) 5. Telegraph messenger	$60.00 month

Occupation of Thirty-one Males from 15–60 Years of Age, Crippled by Loss of Right Arm Above the Elbow

Case Number	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Wage
			Before	Since	
2,765	37	25	Brakeman	1. Station agent, 5 years 2. Proprietor paper-hanger, 6 years	Not stated
1,706	33	24	Pressman (printing), $32.00 week	Peddler (novelties)	Not stated
1,917	28	21	Railroad employee, $18.00 week	1. Switchman, 11 months 2. Presser (tailor shop), 4 years	Irregular
2,894	58	42	Laborer (blanket mills), $1.05 day	Rag-picker, 15 years	$1.30 day
3,051	47	11	None	1. Foreman 2. Salesman (monuments) 3. Real Estate agent, 1 year	Not stated
2,926	44	21	Not stated	Salesman (sewing machines), 18 years	Not stated
1,702	30	19	Brakeman (railroad), 2 weeks, $25.00 month	Sewer Inspector (City), 2 years	$100.00 month
2,051	30	20	Stationary engineer (8 years), $15 week	Stationary Engineer, 2 years	$20.00 week
2,821	55	25	Railroad employee	Storekeeper (Furnace Co.), 10 years	$2.50 day
2,540	46	27	Switchman (railroad)	Switchman (railroad), 19 years	$62.50 month and shanty
2,925	49	23	Switchman (railroad)	Switch-tender (railroad), 26 years	$12.00 week
2,721	37	25	Sawyer (lumber-mill), $4.00 day	Street-trade (paring knives)	Not stated
2,576	41	38	Civil Engineer	Supt. Coke Plant, 3 months	Not stated
2,577	42	28	Machinist	Supt. Tool room, 8 years	Not stated
3,577	40	17	None	Telegrapher, 22 years	$75.00 month
2,976	39	28	Brakeman (35c. hour)	Train dispatcher	Not stated
2,466	44	21	Baker	Watchman, 20 years	$15.00 week
2,169	48	33	Conductor railroad, $100.00 month	Weigh-master, 5 years	$80.00 month
2,671	53	37	Brakeman	Watchman, 15 years	Not stated

TABLE 19

Occupation and Sex	Age at Time of Survey (Years)									
	Number					Per cent Distribution				
	Total	15–19	20–49	50–59	60 Years and Over	Total	15–19	20–49	50–59	60 Years and Over
Male	*1,319*	*49*	*905*	*236*	*129*	*100*	*4*	*69*	*18*	*9*
Manufacturing and mechanical industries	651	29	452	114	56	100	4	70	17	9
Transportation	192	2	117	46	27	100	1	61	24	14
Trade	201	13	137	32	19	100	7	68	16	9
Public service	65	1	42	12	10	100	2	65	18	15
Professional service	45	0	39	6	0	100	0	87	13	0
Domestic and personal service	80	0	54	16	10	100	0	68	20	12
Clerical occupation	49	4	42	1	2	100	8	86	2	4
Not classified	36	0	22	9	5	100	0	61	25	14
Female	*593*	*37*	*350*	*112*	*94*	*100*	*6*	*59*	*19*	*16*
Manufacturing and mechanical industries	77	15	53	5	4	100	19	69	7	5
Transportation	10	0	10	0	0	100	0	100	0	0
Trade	24	4	15	4	1	100	17	62	17	4
Public service	1	0	1	0	0	100	0	100	0	0
Professional service	16	1	9	6	0	100	6	56	38	0
Domestic and personal service	44	3	27	12	2	100	7	61	27	5
Clerical occupation	21	5	16	0	0	100	24	76	0	0
Not classified	0	0	0	0	0	0	0	0	0	0
Housewives	400	9	219	85	87	100	2	55	21	22

OCCUPATION AND AGE

The importance of age in relation to occupation is self-evident, and the preceding tabular statement provides the general facts for both sexes.

OCCUPATION AND AGE AT OCCURRENCE OF DISABILITY

Age at occurrence of disability is an important factor in relation to employment and is shown, by sex, for the group at work in Table 20.

Among males it is clear that a very large proportion in all the occupation groups have become crippled in working life between the ages of twenty and forty-nine, and probably have continued along the line of least resistance at the occupations followed before disability. In certain occupation groups, however, a considerable proportion became handicapped early. The proportions are most notable in Trade, Professional service, and Clerical occupation, obviously departments where muscular effort may be minimized. In these groups, twenty per cent or more of those occupied were crippled under the age of five; and in Professional service and Clerical occupation twenty-five per cent or more became crippled between the ages of five and fourteen. It is notable, however, in every group, with the exception of Clerical occupation, that among men more than forty per cent of those occupied received their disability after they were twenty years of age. The numbers of crippled persons, male or female, who have been injured after the age of fifty and have occupations is small.

Among females employed it is interesting to note that thirty-two per cent of all represent women disabled in infancy, as against seventeen per cent of employed males, and thirty-one per cent disabled during working life, as against forty-seven per cent of males, while the proportions of employed males and females who became crippled during the school period are identical. Even in the short

TABLE 20

Occupation and Sex	Age at Occurrence of Disability (Years)															
	Number								Per cent Distribution							
	Total	Under 5	5–14	15–19	20–49	50–59	60 and Over	Not Stated	Total	Under 5	5–14	15–19	20–49	50–59	60 and Over	Not Stated
Male	*1,319*	*215*	*213*	*170*	*613*	*76*	*16*	*16*	*100*	*17*	*16*	*13*	*47*	*5*	*1*	*1*
Manufacturing and mechanical industries	651	112	105	91	288	45	6	4	100	17	17	14	44	6	1—	1—
Transportation	192	15	23	18	116	14	3	3	100	8	12	9	60	7	2	2
Trade	201	44	32	28	85	9	3	0	100	22	16	14	42	4	2	0
Public service	65	6	9	6	37	3	1	3	100	9	14	9	57	5	1	5
Professional service	45	9	11	1	22	0	0	2	100	20	25	2	49	0	0	4
Domestic and personal service	80	11	13	9	41	2	1	3	100	14	16	11	51	3	1	4
Clerical occupation	49	10	15	16	6	1	0	1	100	20	31	33	12	2	0	2
Not classified	36	8	5	1	18	2	2	0	100	22	14	2	50	6	6	0
Female	*593*	*192*	*96*	*23*	*186*	*50*	*41*	*5*	*100*	*32*	*16*	*4*	*31*	*9*	*7*	*1—*
Manufacturing and mechanical industries	77	40	21	5	7	2	1	1	100	52	27	7	9	3	1	1
Transportation	10	5	4	0	1	0	0	0	100	50	40	0	10	0	0	0
Trade	24	10	4	4	5	1	0	0	100	42	17	17	20	4	0	0
Public service	1	1	0	0	0	0	0	0	100	100	0	0	0	0	0	0
Professional service	16	12	2	0	1	0	0	1	100	75	13	0	6	0	0	6
Domestic and personal service	44	12	9	0	20	2	0	1	100	27	21	0	45	5	0	2
Clerical occupation	21	16	3	1	1	0	0	0	100	76	14	5	5	0	0	0
Not classified	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
Housewives	400	96	53	13	151	45	40	2	100	24	13	3	38	11	10	1—

period, fifteen to nineteen years of age, the increasing contrast between the liability to disablement of boys and girls is suggested by thirteen per cent of employed men who had been disabled in that period and four per cent employed women.

ABILITY TO WORK

All persons enumerated in the Survey between the ages of fifteen and sixty have been classified according to their ability to work, with the following results:

TABLE 21

Ability to Work	Number			Per cent Distribution		
	Total	Male	Female	Total	Male	Female
All groups	*2,553*	*1,738*	*815*	*100*	*100*	*100*
A. Not seriously handicapped for normal occupation	753	566	187	29	32	23
B. Able to work at selected trades and processes	1,142	835	307	45	48	38
C. Disabled (*i. e.*, for work alongside normal persons)	658	337	321	26	20	39

It should be kept distinctly in mind that a classification like the above rests more or less upon the judgment of those who make it. It is not a simple statement of fact reported by the enumerator upon the statement of the crippled individual or his family, but represents the best judgment of the director and associate director responsible for the report. In the case of persons at work there is small occasion for debate—the individual is classified on his record at time of survey. But in the case of persons not at work the classification represents the best judgment of the directors after due consideration of all the facts contained in the schedule. A second visit, or acquaintance over a long period of time, might obviously change the judgment.

The first group, 'not seriously handicapped for normal occupation', is one made up very largely of persons who have suffered a loss or defect of one foot or leg. It includes also persons suffering minor defects of hand or arm and a considerable number of persons with deformity of body, but apparently handicapped in appearance only and having strength enough for competitive industry. This group contains 753 persons, or twenty-nine per cent of the total. It should also be remembered that in all groups alike the classification is made without regard to actual employment or unemployment at time of survey. As a matter of fact, 648 of Group *A* happened to be at work, 892 of Group *B*, and 154 of Group *C*. This is of interest because it shows how differently the lives of people with the same handicap are ordered. Taken together these figures indicate that in the opinion of the directors seventy-four per cent of crippled persons over fifteen years of age are probably capable of profitable employment alongside normal persons. This does not involve judgment, however, as to whether or not they could secure placement for themselves unaided.

By way of reminder of the individual problems that characterize each group, illustrative cases of the three types may be helpful, as follows:

A. Not Seriously Handicapped for Normal Occupation

The man with both legs amputated below the knee finds no difficulty in competing with normal men so long as he has some background of education, and so long as his attitude toward life and toward himself is normal. One man now thirty-four years old, when eighteen years of age had both legs amputated as a result of accident. This proved to be no obstacle in his career. For many years he was clerk in a cigar store, and for seven years has been a successful salesman in the employ of an artificial-limb company.

Similar instances are found among women. We even have a successful one-armed housewife who has been so handicapped since childhood. Before marriage she was a nursemaid, and today she is the mother of three children, doing all her own housework, including washing and ironing. In addition, for recreation she finds time to crochet beautiful laces.

Another illustration is that of a young woman with serious deformity of both legs which necessitates the use of a wheel chair out of doors. This handicap has been present since early childhood, but has not prevented her from becoming a skillful musician and successful music teacher.

B. Able to Work at Selected Trades and Processes

With ingenuity and intelligence many handicapped persons have fitted themselves permanently and efficiently into suitable places of employment. We find a man with left leg and left arm amputated at the age of nineteen, when he was learning to be a machinist, completing his high-school course, then taking a business course, and becoming a responsible bookkeeper in a business concern; the man who met with a serious accident which resulted in a stiff leg continuing his occupation of architect, but discontinuing the immediate superintendence of building operations and devoting his time almost entirely to drawing of plans and office work; the man with infantile paralysis since childhood who has always chosen work where he could be seated and for five years has been a stove assembler in a large factory.

C. Disabled for Work alongside Normal Persons

Unless the handicap is so serious as to affect the use of both hands and feet or unless there is a combination of physical with mental or other defects, the crippled individual rarely falls into the class of those disabled for work alongside normal persons. Typical of the group so disabled is a young man thirty-four years old who has had a deformity of spine since he was a few months old. He is very delicate and, in addition, is not of normal mentality. He has tried various jobs but has been unable to keep any. A man suffering presumably from industrial disease is so handicapped as to be confined to a wheel chair but has the use of his hands and needs to earn. Another man so seriously deformed as a result of infantile paralysis that he is unable to straighten his legs and has both hands slightly paralyzed is most ambitious to work. With little or practically no education, and with a handicap so disfiguring and hampering, work in competition with the normal is an impossibility for him.

REASONS FOR UNEMPLOYMENT

TABLE 22

Reasons for Unemployment	Number			Per cent Distribution		
	Total	Male	Female	Total	Male	Female
All groups	*859*	*543*	*316*	*100*	*100*	*100*
A. Need of placement at selected trades and processes	189	133	56	22	24	18
B. Need of special training or special conditions of work	130	108	22	15	20	7
C. Need of home or hospital occupation	45	15	30	5	3	9
D. Not classified	495	287	208	58	53	66

In Table 22, which again represents the best judgment of the directors rather than the statements of individuals or enumerators, 859 crippled persons between the ages of fifteen and sixty, at time of survey, are classified by reasons for unemployment. The figure for *not classified*, 495, or fifty-eight per cent of the total, is, of course, so large as to arouse immediate question, but it does not mean that little is known about this group. In reality considerable is known, enough to make their placement in any one of the three groups unnecessary, difficult, or impossible. Sometimes the difficulty is temporary, sometimes permanent. In all cases it would require time and longer acquaintance to determine the classification. Among the varied reasons, necessitating such delay in decision, are: recent accident cases with prognosis as to extent of handicap uncertain; general physical condition uncertain; questions of general tuberculosis, locomotor ataxia, etc.; other handicaps combined with crippled conditions, mental diseases and bad habits, alcoholism, laziness, etc. Others have adequate home duties; others independent means; still others are awaiting decision as to compensation for accident, etc.

The numbers, then, in Groups *A*, *B*, and *C* represent minimum estimates, and Group *D* would, without question, contribute eventually to all three preceding groups. It contains also, however, the *not helpable* and the inevitable accumulation of those whom it is *too late* to help with any substantial hope for economic success.

This group is analyzed further in relation to form of handicap in Table 23, which makes it once more apparent that we cannot justly classify people by physical handicap alone.

By way of reminder of the individual problems that characterize each group, the following illustrative cases may be helpful:

A. Need of Placement at Selected Trades and Processes

A young man, twenty years old, with a disabled leg and disabled arms, the result of an automobile accident, using crutches probably for life, will need careful placement at a selected trade.

B. Need of Special Training or Special Conditions of Work

Another young man, twenty-eight years old, seriously handicapped by a paralyzed right side, the result of infantile paralysis, is very delicate in addition, but ambitious to work. He has very little education and needs special conditions for work.

A boy seventeen years of age, also disabled as a result of infantile paralysis, who will probably be able to walk with the aid of braces, and has the use of one arm, was in his third year at high school when overtaken by this disease. He had planned to be an architect but this career at the present time is cut off.

C. Need of Home or Hospital Occupation

A man twenty-seven years old is crippled as a result of spastic paralysis and confined since childhood to a wheel chair. He is unable to use his arms to any extent. In order to write he holds the pencil with one hand and guides it with the other. A more ambitious and eager worker could not be found. In spite of his handicap he went through high school, taking much longer, naturally, than the average person. He has attempted getting subscriptions for a magazine and really needs home work.

Another man with no use of lower limbs is entirely confined to a wheel chair. He had had a fine business experience, and after the accident which resulted in his present condition, studied photography. Through his own initiative he has developed as a home industry a small commercial business with factories. He needs more work because he earns scarcely enough to support his aged mother, who is practically dependent upon him.

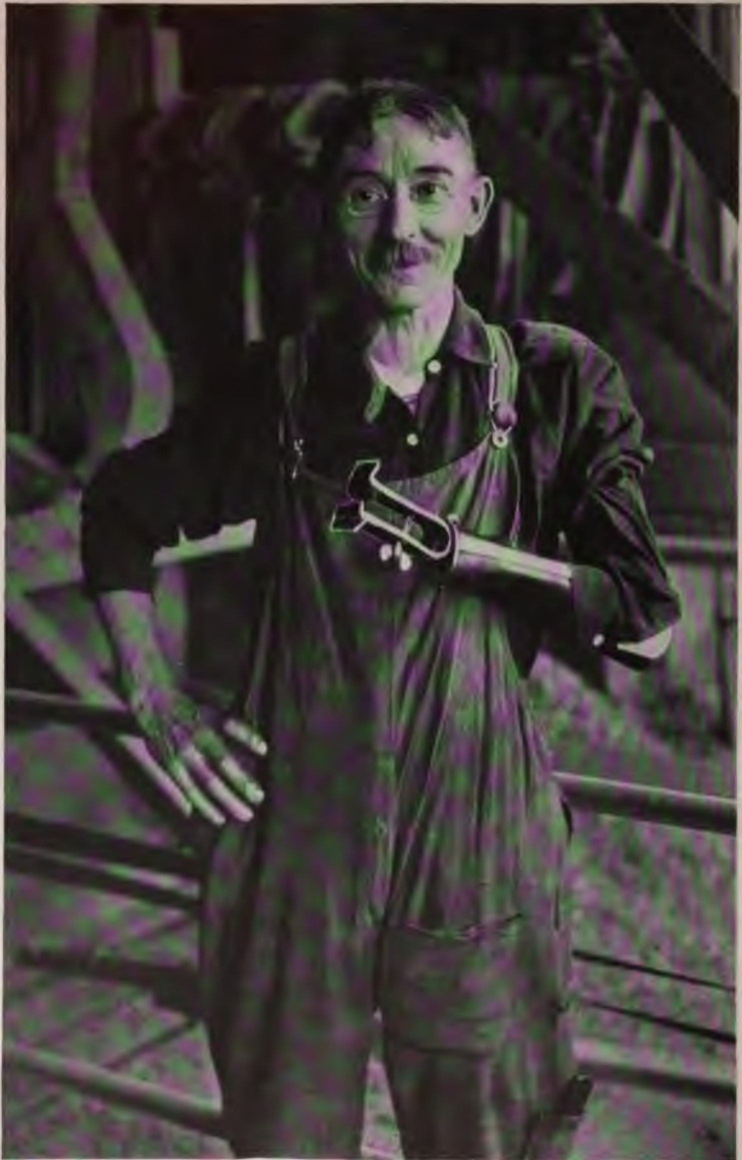
SUPPORT

The statements in regard to means of support of the entire group of adults are of special interest as showing the degree of economic independence of this group. They show that 1,743, or fifty-three per cent, are earning a living, and that more than half of these are earning a living not for themselves alone, but for others, while 400 are self-supporting as active housewives. Of those supported by other means than work, 1,034 out of a total of 1,418 are supported by their families, 136 by income, and 125 by

TABLE 23

Reasons for Unemployment	Number								Per cent Distribution							
	Total	Loss of hand or arm	Defect of hand or arm	Loss of foot or leg	Defect of foot or leg	Loss or defect of one or both arms and of one or both legs	Deformity or paralysis of body and unclassified	Disability of arms or legs or of both and of body	Total	Loss of hand or arm	Defect of hand or arm	Loss of foot or leg	Defect of foot or leg	Loss or defect of one or both arms and of one or both legs	Deformity or paralysis of body and unclassified	Disability of arms or legs or of both and of body
All groups	*859*	*29*	*77*	*88*	*345*	*102*	*73*	*145*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
Need placement at selected trades and processes	189	9	25	28	101	4	13	9	22	31	32	32	29	4	18	6
Need special training or special conditions of work	130	3	18	17	51	20	14	7	15	10	23	19	15	20	19	5
Need home or hospital occupation	45	1	2	1	24	1	4	12	5	4	3	1	7	1–	5	8
Not classified	495	16	32	42	169	77	42	117	58	55	42	48	49	75	58	81

Lost right arm and foreman's position through an industrial accident



Restored to industry by an arm and hand of his own invention relief agencies. The very small number in receipt of industrial pensions, 56, raises the question whether industry is bearing its just share of the burden in proportion to the number of industrial accidents. So long as the number of cripples given re-employment is considerable and the operation of the workmen's compensation laws comparatively recent, it would not be fair to draw conclusions from this very general study. The record of economic independence of cripples and their families is, however, clear beyond question.

There is a group not brought out in any one table which may be mentioned here who might be helped to home industry in a small way and contribute a trifle, at least, toward their own support if they could be taught by home-teachers. They are persons, both men and women, who are eager for and appreciative of occupation. They are invalids or aged—not a large group, but one with a genuine, human desire for an active share in life, however small, needing a fresh interest to come to them from outside, but without ingenuity to create a special interest for themselves.

TABLE 24

Means of Support	Number			Per cent Distribution		
	Total	Male	Female	Total	Male	Female
Total	*3,250*	*2,123*	*1,127*	*100*	*100*	*100*
Earning a living	1,743	1,229	514	53	58	46
For self	(405)	(318)	(87)			
For self and others	(938)	(911)	(27)			
Housewives	(400)		(400)			
Partly self-supporting	89	42	47	3	2	4
Supported by	1,418	852	566	44	40	50
Income	(136)	(113)	(23)			
Pension	(56)	(47)	(9)			
Family	(1,034)	(559)	(475)			
Relief agencies	(125)	(71)	(54)			
Unclassified	(67)	(62)	(5)			

III. What May Be Done About the Handicapped

From the point of view of social service the problem of the handicapped presents the immediate task of making plans for the two groups represented in this study by 936 crippled children and 859 adults not at work. There is always a wide range of possibilities in discussing the needs of the handicapped, for in addition to their particular form of physical disability they, like the rest of us, are exposed to all the other ills flesh is heir to. It would be easy to discuss the findings of the Survey from many other points of view, but the one outlined in the introduction allows us to focus on educational and industrial questions as the vital points at issue in a non-medical study, as well as the points in which work for cripples differs in technical respects from any other social work. It is these considerations, besides medical ones, which require or justify us in regarding crippled persons even temporarily as a class.

Children

In the case of children, especially, medical and educational needs cannot be considered effectively apart from each other, and it is particularly fortunate that for this group the non-medical Survey has been supplemented by medical observation.

Moreover, the objectives of our task are more clearly indicated in the case of children, not only by the nature of their needs but by the experiments already tried, in Cleveland and elsewhere, for their care and education. To what definite means, then, in the light of local resources and the experiences of other states, do the findings of the

Survey point as best adapted in meeting the set of conditions that hamper the lives of crippled children?

The important facts about children brought out in the Analysis of Statistics were, briefly stated:

Age and School Attendance

936 children under fifteen years of age.
771 of school age.
415 in regular public school-classes.
110 in special classes for cripples.
246 of school age, not in school.
165 under five years of age.

Causes of Disability

Of 936 children, 382, or forty-one per cent, were disabled by infantile paralysis and 139, or fifteen per cent, by tubercular bones and joints.

Of 246 children of school age at home 105 were of compulsory school age, and thirty-nine 'under medical treatment' at time of visit.

Of 110 children in special classes, 66 were disabled by infantile paralysis and tubercular bones and joints.

Is it clear that existing resources do not meet the needs of these children? In Section VII, page 187, is given a summary of present available means other than the work of general hospitals, for the care of crippled children in Cleveland: The Rainbow Hospital, Holy Cross House, the Willson School Classes, and the Sunbeam Association.

The Rainbow Hospital for crippled and convalescent children is an institution for medical care which provides, to a certain extent, for the schooling of children under its care. The hospital receives from sixty to eighty-five children at a time, of whom a large proportion are cripples. It rarely keeps children as long as one year.

Holy Cross House provides a home with medical and surgical attendance for crippled and invalid children, furnishes a common-school education, and in its new building can care for fifty children at a time. It sends children who are able to go to the day class at the Willson School.

The Willson School Classes are special day classes in the public school accommodating one hundred and ten crippled children who would not be received in regular classes because of the nature or extent (or both) of their physical disability.

The Sunbeam Association is an organization interested in adults as well as children which stands ready to promote the interests of cripples in various ways.

What more is needed to provide for an aggregate of 936 crippled children, of whom 771 are of school age, 415 in regular classes in the public schools, and 110 in special classes for crippled children? It is evidently not a matter of large numbers, since of 771 children of school age 525 are in school.

Even the matter of numbers, however, presents something of a problem, for it is obvious that whatever the reasons may be, a considerable proportion of children of school age (246) were not benefiting at time of survey by any of the resources for cripples which have been mentioned. It is clear, furthermore, that in this number were not only those who are kept from school by mental defect but also children still under medical care, and others who are too handicapped or live too far away to take advantage of day classes—children whose combined needs for education and care can be met only by an institution.

The problem of mere numbers would not be serious were it not for the questions raised by the nature of the causes of crippled conditions among all children and for the standards for their education and care already set elsewhere. These considerations force attention not only to numbers unprovided for but to the question of how suitably existing institutions meet the needs of those already in their care.

If we accept the fact that many crippled children need combined medical-educational care over long periods of time, in order to get the full benefit of both treatment and instruction, and that they need, in addition, special vocational preparation for life, then the existing resources in Cleveland are not adequate or satisfactory.

The Rainbow Hospital, for example, is designed and equipped to provide education and medical treatment only for limited periods of time. It is a much-needed institution, but a hospital first and last, which affords general rather than special schooling.

Holy Cross House is essentially a home—neither a hospital nor a school in the full sense of the words—and although it admits without regard to race or creed, its possibilities for general public service are inevitably limited by denominational organization. It belongs in the class of small special children's homes.

The Willson School classes have the advantage of being a part of the public-school system, but are obviously cramped by limits of space both in educational and medical work. As a day-school system the Willson School plan compels constant travel for children from long distances. Hours that would naturally be spent in the open air are spent in the 'bus', a serious thing for any children, but more especially for those suffering from disabilities of such form and nature as necessitate special class work. The cramped resources for medical care at the school also oblige the children under treatment to travel to and from clinics. Add to these conditions inadequate schoolroom facilities, lack of space for lunch, and other semi-institutional privileges required by these children, and the necessity of restricting indoor recreation to the long corridor as the only indoor play-room (see frontispiece), and the school becomes an unfavorable setting for crippled children which is frankly recognized by all who are familiar with the situation.

The Sunbeam Association has supported special workers for children in connection with the Willson School and Lakeside Dispensary, but has devoted itself more largely to work for women and the support of this Survey.

The experience of other states and countries unquestionably points to the advantages of institutional care over varying periods of time for crippled children. The Hospital School for Crippled Children at Canton, Massachusetts, originally planned as the result of studies by a State Commission of the best methods of caring for crippled children in this country and abroad, is now the result of ten years' growth. This school is characterized briefly in this report (page 197), and is also described among thirty-seven other institutions for the care of cripples in the Reeves Study, published by the Sage Foundation, in 1914.[1] Such institutions as this, the Reeves study points out, have 'successfully abandoned the traditions of both hospitals and asylums' and created a new standard for the care of crippled children in this country. The Reeves Study is inclined to commend the Hospital School chiefly for its service to rural communities that are without orthopedic clinics, but crippled children have other needs, common to city and country alike, which can be met adequately only by the form of care provided by the hospital-school, two of which are out-of-door life and vocational preparation for life. The Hospital School of Massachusetts reports on the preventive side the arresting of disease in ninety per cent of cases of children with tubercular bones and joints, and in its vocational work wisely chooses department employees for farm, office, laundry, etc., with a view to their fitness to teach. Thus, for instance, no less than seventy-five opportunities are given for vocational training through the apprenticeship system for all children who can benefit by it, possibilities obviously increased by rural location as well as type of plant.

---

[1] *Care and Education of Crippled Children*, Russell Sage Foundation, 1914.

The fact that genuine opportunity for vocational training is so largely lacking in our system of educating normal children, and that in the case of cripples vocational training must be especially adapted not only to variety of aptitudes but to the different handicaps, is the final and conclusive point in favor of institutional provision in order to prepare a large number of crippled children for life.

Surveys inevitably raise as well as answer questions, and without medical judgment in each case it is not possible to tell the exact numbers that would benefit by a new or enlarged resource for cripples. It cannot be said, for example, how many of the 415 children in regular classes might benefit by special care. In the same way, it is not possible to tell without closer study how many of the 110 children in the Willson School Classes might be restored to regular classes or better prepared for their work in life by a period of competent institutional care. We can only say that, judging by the experience of other institutions, the chances would be increased for this group, at least for the 66 children crippled by infantile paralysis and tubercular bones and joints now in the special classes, as well as for the 246 children of school age not in school, and again for the 165 children under five. To state it in figures, the total number of children under consideration is 936, and of these forty-one per cent were crippled by infantile paralysis and fifteen per cent by tubercular bones and joints, so that fifty-six per cent of the number present conditions especially recognized as helpable by institutional care of the right kind.

The demand for a new or enlarged means for the care and training of crippled children in Cleveland does not arise from a failure of the community to recognize separately the medical and educational requirements of crippled children through the Rainbow Hospital on the one hand, and the Willson School on the other, so much as from a failure to co-ordinate these and other forces affecting the life of each crippled child.

Things which it is important to consider in planning a hospital-school are suggested by the account of the Massachusetts School given elsewhere (see page 197). But even in this sketch it must be made clear that such an institution should not be a detached unit, an end in itself, unrelated to the system of education of city or state, or both. To be adequate and sound it should be vitally related to the general system of education in such a manner that each crippled child may be restored to his normal place in the regular classes of public school whenever he is ready for it without suffering from loss of the special advantages that only institutional life can give. Better no such school unless the disadvantages of institutional life are truly offset by its advantages and unless its direction can be kept out of destructive politics.

Adults

It is a much more complex and difficult task to work out even the 'next steps' towards adequate and suitable provisions wherewith to meet the needs of crippled adults. In the first place, it is much harder to keep any organized work for adults out of the clutch of destructive politics and in the grasp of constructive forces than it is work for children. This is no reason for shirking work for adults, only rather for planning it with great care and on a sound basis. Unfortunately, there is no ready-made plan or recipe for meeting the requirements of handicapped adults. The nature and variety of the educational and industrial needs of adults, as well as their varying forms and degrees of handicap do not demand institutional care, but rather a variety of provisions of non-institutional character or a minimum of an institutional character.

Legislation is needed to safeguard the rights of competent handicapped labor, with due regard, of course, to the rights of other laborers and the question of cost to employer.

As has already been pointed out in the introduction, the willing employer of competent handicapped labor will not stand for increased rates of insurance or liability for compensation in case of accident to handicapped workmen, especially if the employees in question were not originally handicapped in his employ. It is also true that in many states the adjustment between compensation and returns from renewed labor is so far from clear or favorable to the workmen that, like the disabled soldiers under faulty insurance or pension acts, the tendency of the individual is to protect himself by declining offers of training and employment lest it interfere with amount or duration of compensation. This point needs to be made as clear in industry as it is in the insurance act for soldiers, where compensation is made not an influence deterring from occupation but rather an influence for it, being contingent upon the acceptance of training and employment for all who are able.

The matter of responsibility for compensation for handicapped labor, in case of accident, is a constantly recurring question with all concerned about the labor of the blind, crippled, deaf, and other physically handicapped persons. A Massachusetts employer and others have suggested that special state provision be made for meeting any increased cost to the employer over and above what he would incur for an able-bodied workman. It has been further suggested that this be met through whatever agency is the natural employment agency for the group, as in the case of the blind, a state commission for the blind. This kind of adjustment does not appear to have been worked out in any state as yet, but activity in this direction may well be hastened by the possible addition to the population of disabled soldiers in need of work. It is to be remembered in this connection that while this war may double the number of cripples to be considered each year, information to date suggests that industry and general accident are regularly contributing as many as, and perhaps more than, war to this part of the population.

Adequate provision, probably by hospital extension work, should be made for the rehabilitation of newly-made cripples; and for the beginning of their re-education and even vocational training, when that is contributory to treatment, during convalescence. Such work may fairly be regarded as a part of treatment, in the larger sense—as for instance, to provide artificial limbs and to furnish such occupation and training as is possible during convalescence and will prove a bridge to re-employment. This means a fuller recognition and larger interpretation of the values of occupational therapy during convalescence. If these conditions are met, there would remain the questions of a more complete re-education for those who need it, of systematic placement in industry for those who cannot place themselves promptly, and probably of employment under special conditions for a remaining few. Until the first-mentioned needs have been provided for and tried out, however, there is no way of telling, and probably it is unwise to try to tell how great a number need the second form of service. It is important to remember this in a piece of pioneer work which at the start unavoidably faces an accumulation of products of long neglect.

Social workers can very easily be misled and begin at the wrong end unless they are so fortunate as in the case of Cleveland to have a survey to guide them. The effort to meet the first two needs, the rehabilitation and reeducation of cripples, will give workers of ability and purpose the most valuable opportunity for securing the right experience and the facts to guide them to the next steps. It is not necessary to await further investigations before taking these first steps, provided the right organization with good workers is supplied for the purpose of learning by actual experiment. Cripples who are the by-products of accident, let alone war, offer a persistent challenge to the community, and war times issue a still louder challenge to prompt and definite experiment in this direction.

The degree of economic independence attained by cripples who have had no special opportunities beyond what the community offers to all alike, the well-known disadvantages of the permanent segregation of any group on the basis of a common handicap alone, and the evils of class legislation, all sharpen the emphasis on care in devising plans for service to cripples. An organization intended for such a service must be acceptable in form, purpose, and spirit to the most independent among cripples who may need it. Therefore, it must be devoid of charitable or philanthropic claims, and a service offered on a sound economic basis for the prevention of needless handicaps and for minimizing the results of handicap by whatever means will help the individual to make his own contribution to that end. It must recognize not only the mental needs of the handicapped but such physical facts about the make-up of the crippled population as the Survey shows. Like the general population, the crippled group contains a great variety of people, few of whom want or need the same thing at the same time. Attempts to run all handicapped persons through the same educational or industrial mold are even more futile than they would be with the general population, but the temptation to do it is, under the circumstances, even greater. The unkindness and wastefulness of putting the physically handicapped in a needlessly artificial or wholly false position that detaches them from the standards and aims common to all has been already demonstrated in certain types of work for the blind, and cannot be over-emphasized.

There is no short cut by which the solution of the problem of handicapped adults may be reached. Shop-schools in themselves are not a remedy for the idleness even of a few persons unless they have a genuine place in the business world of demand and supply. Subsidized shops are no solution unless they can in some measure *profitably* employ handicapped labor. Industrial training is in itself no solution unless it takes into account the chances of the individual in competitive industry, and not by the test of comparison with other cripples, but with the average man in the prospective fields of work. Under all these circumstances we need a practical center for making sure what qualities the physically handicapped individual has to offset his lacks, what places in industry he may rightly expect to fill, and what obstacles must be removed before he can reach them. This is not a job for amateurs unless they are determined to gain the experience that will put their work on a footing which is just to the competent and incompetent alike.

The place to which the friends of crippled adults should look for guidance in the technique of their rehabilitation and re-education is Europe, where, as has been pointed out in the introduction, there already was better knowledge of this problem than in the United States before the war, and where, since the war, remarkable standards have been set that revolutionize earlier methods of care, adaptation, use of appliances, and of vocational estimates and preparation.

Provision for complete re-education and adequate vocational training for those adults who need it may deservedly be worked out in conjunction with a general state plan for all competent persons, the physically handicapped and those with whole bodies alike, and can be, wherever a state is devising a new and adequate plan, as Ohio is or must be doing soon. Such a plan must, however, be flexible enough to allow not only for special departmental work but for as varied forms of apprenticeship for adults as the Massachusetts Hospital School (see page 197) offers children. It must presuppose a far more flexible system than the trade-school system, in general, permits today if among other things it is to provide for the needs of cripples, which are trebled and quadrupled in variety compared with those of the average man by the many forms of muscular and skeletal handicap. Whether the plan for cripples is made a part of the general state plan for industrial training or not, it is clear that to furnish the necessary variety it will be dependent upon the co-operation of employers who provide opportunities for training in characteristic industries and occupations of any given community if it is to provide adequate chances for apprenticeship. These are the facts and needs that make recommendation of artificially devised shops or special trade schools of limited value.

To summarize briefly the important facts about crippled adults that lie behind this discussion and are brought out in the analysis of statistics:

Age

2,553, or sixty-one per cent of all cripples found were between fifteen and sixty years of age at time of survey.

2,252, or fifty-four per cent of the whole group, were between the ages of twenty and sixty years.

Of these 1,569 were males and 683 females.

Age at Occurrence of Disability

1,568 of the whole group of adults became crippled between the ages of twenty and sixty years.

Accident as a Cause of Disability

1,791, or forty-three per cent of all cases, became crippled as a result of accident.

1,077, or sixty-eight per cent of 1,569 males between the ages of twenty and sixty years became crippled as a result of accident.

210, or thirty per cent of 683 females between the ages of twenty and sixty became crippled as a result of accident.

Occupation

Of 3,250 persons over fifteen years of age fifty-nine per cent were employed at time of survey.

Every type of disability was represented among the 1,912 persons at work, as well as among the 1,338 persons not at work.

Of the 1,319 males at work forty-nine per cent were employed in manufacturing and mechanical industries, fifteen per cent in transportation, and fifteen per cent in trade.

Of 593 females at work 400, or sixty-seven per cent, were active housewives.

Of 1,912 persons at work the exact earnings of thirty-six per cent were *not stated*. This includes 400 housewives and 296 others who did not state income. Of the 1,216 persons whose earnings are stated, 383 were earning from $10 to $15 per week; 350 from $15 to $20 per week; 107 from $20 to $25 per week.

Of sixty occupations followed by four or more crippled men, the large groups, with few exceptions, represent unskilled workmen—watchmen, laborers, elevator men, etc., or work not largely dependent upon muscular activity, such as that of clerks, salesmen, foremen, proprietors.

Ability to Work

Of 2,553 persons between fifteen and sixty years of age, classified by ***ability to work***, without regard to actual employment:

Not seriously handicapped for normal occupation	753, or 29 per cent
Able to work at selected trades and processes	1,142, or 45 per cent
Disabled (*i. e.*, for work alongside normal persons)	658, or 26 per cent

Reasons for Unemployment

Of 859 between the ages of fifteen and sixty not at work:

Need placement at selected trades and processes	189, or 22 per cent
Need special training or special conditions of work	130, or 15 per cent
Need home or hospital occupation	45, or 5 per cent
Not classified	495, or 58 per cent

Not classified means that enough is known to make placement in the three selected groups unnecessary, difficult or impossible for the time being at least. It means not so much that these individuals are not helpable as that the way to help them was not clear at time of survey, and would at least require longer and closer acquaintance to determine.

One important consideration to be remembered in addition to the fact of 859 persons out of employment is that there are added types of need to be found among those partially or inadequately occupied. There is the type of man who has lost a leg through industrial accident and has as part compensation been given a job by his employer which does not use his capabilities; for example, a young man of thirty, a bridge constructor formerly employed at $4 a day, now employed at running an elevator at $10 a week—glad of a job, but equal to more.

There is the man with a crippled spine, dependent upon a wheel chair, who has acquired the trade of commercial photography and must practise it at home, where, in spite of competent work, he has not known how to make his contact with the business world—an instance of the nature of the whole question of home industry for partly invalided cripples. In the same group of the inadequately occupied is a victim of industrial disease, at the age of forty-three, working as a laborer at $2 a day because caisson disease, or 'bends', has unfitted him for his old work at tunnel construction at twice that wage. He is one more instance of the faithful laborer cruelly rewarded by nature and society.

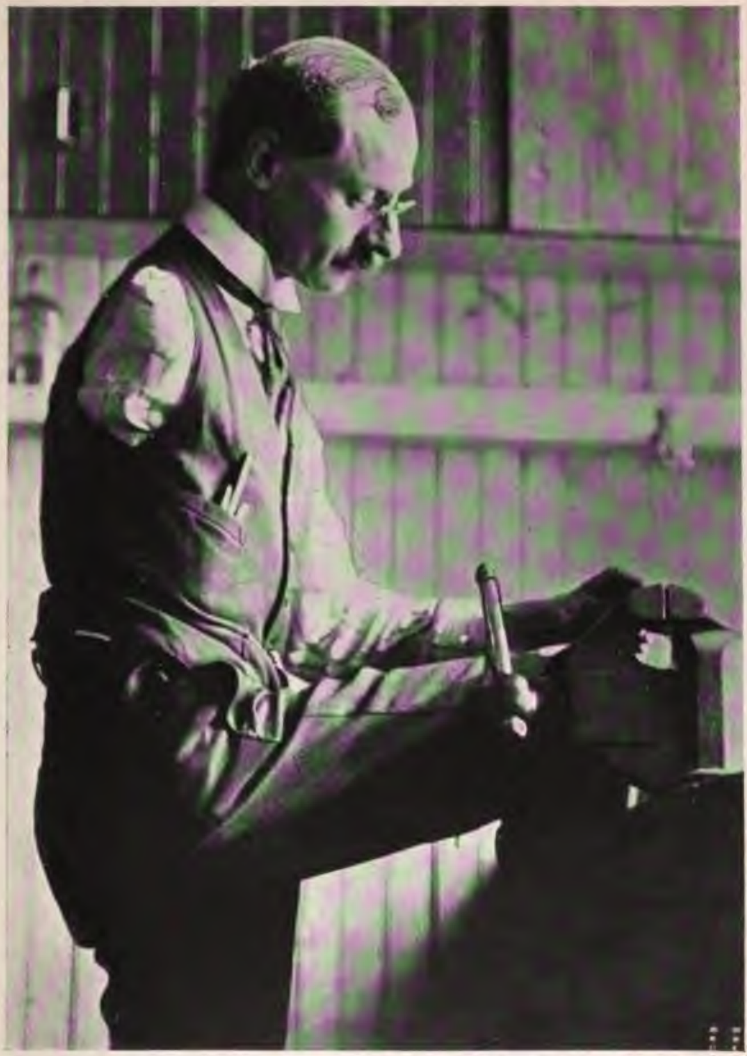
The partly employed and the unoccupied present alike a set of needs so varied as to call for the most flexible form of organization for their service. One man who has lost a leg by industrial accident, and spent his compensation money in various unsuccessful experiments, is unoccupied chiefly because he has 'lost his nerve'. Another, a victim of industrial disease, is confined to a wheel chair, and at fifty-three could probably benefit only by home industry. There is, then, no short cut or single remedy in helping them; but the success of their fellows, with similar disabilities, re-emphasizes the justice of an attempt to restore them to normal industry rather than to employ by artificially devised occupations.

The following paragraphs from the article by Frank B. Gilbreth, consulting engineer, and Mrs. Gilbreth,[2] *Putting the Cripple on the Payroll*, suggest the immediate task before any organization tackling this question of employment of cripples with the necessary amount of scientific spirit:

"Given your individual cripple, study his motion possibilities carefully, then use or adapt every device available or procur-

---

[2] *The Literary Digest*, March 10, 1917.



The man who lost his arm in a planing-mill at fourteen, and after literally 'trying his hand' at five different jobs has followed the trade of locksmith successfully for nine years

MU

able. When you have done this, still more can be done by fitting your cripple to your best existing device. Those who have read the record of the marvelous work being done abroad, and of the increased number of minutes of happiness that are resulting among these cripples who are enabled to become interested, productive members of the community through this work, can appreciate the need of co-operating, here in this country, and of thus reducing the amount of work that must be done there to a minimum, for while we hope the wars will cease, the knowledge will be useful for industrial workers forever.

While waiting for the slow progress of inventing methods and devices to be modified and adapted to the need of cripples, it is hoped that some society will cause to be collected as many as possible of the histories of cases where cripples have become able to cope successfully with their handicaps. Such data should be compiled, properly classified, cross-indexed, and incorporated in a series of books, copies of which should be put in every large library in the world. The book would eventually pay for its cost of compilation and distribution. Such a series of books would not only cheer and encourage many a discouraged cripple but would also be a contributing cause toward actually putting the cripple again on the payroll, with a consequent economic gain to the world.

This work will undoubtedly be done. Individual histories and improvements will come from each man and woman interesting himself or herself, to observe, record, and pass on data describing actual histories of cases where cripples have become successful. It is this active, interested, practical co-operation that is needed, and is needed now."

CONCLUSION

An organization having the larger purposes in mind, with the register and analyzed facts secured through the Survey as a working basis, and determined to find a democratic and adequate plan for getting under the whole load of appropriate provision for cripples—special education of children and a recognized place of usefulness for adults alike—will be in a rarely attainable position for sound work. It would be better, however, never to have organized unless the work is done with an irresistible determination to develop so that the helpable but independent group of cripples will not be converted into a self-conscious class. That the crippled population of Cleveland deserves to have the community make a response to its needs as noble in proportion as its own effort will be discovered by even a slight scrutiny of the story the Survey has to tell.

In order that the needs of both adults and children in Cleveland may be met, a central bureau, or federation of agencies interested in cripples, is recommended that would represent not only existing agencies especially instituted for cripples but all the forces touching their lives most closely—medical, educational, and industrial. Its program should be carefully worked out for the 'long run' on the basis of the facts brought out by the Survey and considered both in the light of local resources and the experience of other states. Such an organization should among other things: work for adequate medical-educational care for crippled children as a part of or closely correlated with the school system; devise the various means of safeguarding the interests of crippled adults (or aim at a separate organization to be devoted to those ends); and secure (provide, if necessary) the training of workers able to carry out its program. The 'various means' for adults will include:

1. Legislation adjusting, for employer and employee alike, all matters of compensation and insurance that now stand in the way of re-employment, especially that employers may be encouraged to do more in view of war conditions.

2. Provision for the application of all that has been learned through the war of the use of appliances, and of

early vocational estimates and preparation, as well as the more familiar principles of occupational therapy in the convalescent period.

3. Provision for industrial training for the competent among the handicapped as a part of an adequate system of industrial training for all citizens, correlated, preferably with federal as well as state plans for vocational training.

4. Special provision for placement of those who cannot place themselves and for the special employment or home industry of semi-invalid cripples capable of taking some small part in active life.

Above all and through all this work must run the purpose of preventive effort to forestall crippled conditions from accident, infantile paralysis, and other disease—study, educational campaigns, and legislation, if necessary—that no needlessly crippled persons shall be added by disease or accident to the population of Cleveland.

IV. General Tables

CLEVELAND CRIPPLE SURVEY—GENERAL TABLES

TABLE I. *Crippled Persons Enumerated in Cleveland, October, 1915–October, 1916, Classified by Age, Color, Nativity, and Sex*

Age at Time of Survey (Years)	Aggregate			White												Colored		
				Total			Native-born			Foreign-born			Nativity Unknown					
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	*4,186*	*2,638*	*1,548*	*4,076*	*2,586*	*1,490*	*2,668*	*1,638*	*1,030*	*1,401*	*944*	*457*	*7*	*4*	*3*	*110*	*52*	*58*
Under 5	165	88	77	164	88	76	158	85	73	6	3	3				1		1
5–9	416	219	197	409	218	191	382	202	180	27	16	11				7	1	6
10–14	355	208	147	344	203	141	279	163	116	65	40	25				11	5	6
15–19	301	169	132	290	165	125	235	136	99	55	29	26				11	4	7
20–24	290	187	103	282	182	100	218	135	83	64	47	17				8	5	3
25–29	296	223	73	291	221	70	229	168	61	62	53	9				5	2	3
30–34	267	184	83	260	181	79	177	119	58	83	62	21				7	3	4
35–39	299	218	81	292	214	78	166	116	50	125	97	28	1	1		7	4	3
40–44	298	209	89	287	203	84	174	122	52	112	81	31	1		1	11	6	5
45–49	266	185	81	260	182	78	142	100	42	118	82	36				6	3	3
50–54	274	191	83	266	186	80	121	83	38	145	103	42				8	5	3
55–59	262	172	90	253	166	87	112	67	45	141	99	42				9	6	3
60 and over	697	385	312	678	377	301	275	142	133	398	232	166	5	3	2	19	8	11

TABLE 2. *Crippled Persons of Foreign Birth Enumerated in Cleveland, October, 1915–October, 1916, Classified by Age and Country of Birth*

Age at Time of Survey (Years)	Country of Birth										
	Total	Austria-Hungary	Germany	England and Wales	Ireland	Scotland	Canada	Italy	Poland	Russia	Other Countries[1]
All ages	*1,401*	*374*	*384*	*125*	*114*	*29*	*62*	*86*	*63*	*90*	*74*
Under 5	6	1	1					2	1	1	
5– 9	27	12	1	5					4	4	1
10–14	65	33	4	4		1	1	4	5	10	3
15–19	55	23	6	2			3	9	1	8	3
20–24	64	27	6	1		1	5	6	4	10	4
25–29	62	27	9	4	1	2	3	9	2	5	
30–34	83	37	17	4	2	2	3	6	7	3	2
35–39	125	41	24	13	7	3	5	11	9	9	3
40–44	112	38	21	7	8	2	4	9	6	6	11
45–49	118	23	36	9	6	4	5	12	7	8	8
50–54	145	32	35	13	20	2	13	6	5	12	7
55–59	141	20	63	10	17	2	6	6	2	5	10
60 and over	398	60	161	53	53	10	14	6	10	9	22

[1] Including Belgium, Bulgaria, China, *Finland*, France, Greece, Holland, *Norway*, Roumania, Servia, Sweden, *Switzerland* and Syria

TABLE 3. *Crippled Persons under Fifteen Years of Age Enumerated in Cleveland, October, 1915–October, 1916, Classified by Age, Sex, and Home Relations*

Age at Time of Survey (Years)	Crippled Persons under Fifteen Years of Age												
	Aggregate	Both Parents Living			One Parent Living			Both Parents Dead			Not Stated		
		Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	*936*	*843*	*467*	*376*	*81*	*41*	*40*	*7*	*6*	*1*	*5*	*1*	*4*
Under 5 years of age	165	155	84	71	6	2	4	2	2		2		2
6–9 years	416	379	204	175	33	13	20	[illegible]	1	1	2	1	1
10–14 years	355	309	179	130	42	26	16	3	3		1		1

CLEVELAND CRIPPLE SURVEY—GENERAL TABLES

TABLE 4. *Crippled Persons over Fifteen Years of Age Enumerated in Cleveland, October, 1915–October, 1916, Classified by Marital Relations, Age, and Sex*

Age at Time of Survey (Years)	Crippled Persons over Fifteen Years of Age														
	Total					Male					Female				
	Total	Single	Married	Widowed	Divorced	Total	Single	Married	Widowed	Divorced	Total	Single	Married	Widowed	Divorced
All ages	*3,250*	*1,116*	*1,839*	*279*	*16*	*2,123*	*726*	*1,309*	*80*	*8*	*1,127*	*390*	*530*	*199*	*8*
15–19	301	294	7			169	166	3			132	128	4		
20–24	290	240	50			187	155	32			103	85	18		
25–29	296	166	127	1	2	223	121	102			73	45	25	1	2
30–34	267	99	161	4	3	184	71	110	2	1	83	28	51	2	2
35–39	299	84	206	6	3	218	62	153	2	1	81	22	53	4	2
40–44	298	58	227	13		209	43	161	5		89	15	66	8	
45–49	266	47	211	6	2	185	34	148	3		81	13	63	3	2
50–54	274	35	222	15	2	191	23	162	4	2	83	12	60	11	
55–59	262	25	204	32	1	172	13	147	11	1	90	12	57	21	
60 years and over	697	68	424	202	3	385	38	291	53	3	312	30	133	149	

TABLE 5. *Crippled Persons Enumerated in Cleveland, October, 1915–October, 1916, Classified by the Forms of their Physical Disability and Age when it Occurred*

Form of Disability	Age at Occurrence of Disability (Years)														
	Total	Birth to 4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60 and Over	Not Stated
All forms	*4,186*	*1,400*	*352*	*294*	*252*	*250*	*259*	*216*	*179*	*188*	*182*	*161*	*133*	*273*	*47*
Loss of hand or arm															
One	188	5	9	15	34	33	37	16	9	10	7	6	4	3	
Both	6				1	1		1	1		1		1		
Defect of hand or arm															
One	499	101	25	38	68	64	51	32	33	30	13	22	7	10	5
Both	42	15	1	2	2	3	5	2	2		2	4	2	2	
Loss of leg or foot															
One	466	19	47	67	53	67	60	42	32	24	19	7	12	16	1
Both	27	1	2	2	1	4	5	3	3	3	1			1	1
Defect of foot or leg															
One	1,546	706	170	104	62	44	48	49	42	52	57	50	48	98	16
Both	365	163	17	9	7	4	10	14	14	18	24	22	17	40	6
Loss or defect of one or both arms and of one or both legs	332	115	17	7	5	6	13	23	14	19	28	17	16	51	1
Deformity of body	199	122	28	24	3	4	1			4	1		2	5	5
Paralysis of body	6	1			1				1	1	1	1			
Not classified	67	20	16	13	1	1	2	4	3	2	1	1		1	2
Disability of arms or legs or of both and of body	443	132	20	13	14	19	27	30	25	25	27	31	24	46	10

CLEVELAND CRIPPLE SURVEY—GENERAL TABLES

TABLE 6. *Crippled Persons Enumerated in Cleveland, October, 1915–October, 1916, Classified by Age and Form of Physical Disability*

Form of Disability	Age at Time of Survey (Years)													
	Total	Under 5	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60 and Over
All forms	*4,186*	*165*	*416*	*355*	*301*	*290*	*296*	*267*	*299*	*298*	*266*	*274*	*262*	*697*
Loss of hand or arm														
One	188		1	3	2	11	18	26	26	22	22	20	17	20
Both	6						1			2		1	1	1
Defect of hand or arm														
One	499	20	24	29	27	51	52	48	55	46	32	33	31	51
Both	42	4	3	4	2	2	5	2	2	3	3	2	6	4
Loss of foot or leg														
One	466		8	24	22	30	62	51	59	47	42	31	32	58
Both	27				1	1	7	2	2	1	4	2	5	2
Defect of foot or leg														
One	1,546	75	201	165	144	113	81	87	90	96	83	101	76	234
Both	365	29	62	26	18	17	9	6	15	20	20	28	31	84
Loss or defect of one or both arms and one or both legs	332	10	44	25	15	22	16	11	14	26	18	18	27	86
Deformity of body	199	5	27	41	30	21	15	18	9	6	9	3	2	13
Paralysis of body	6		1		1					1		1		2
Not classified	67		19	11	11	1	4	2	3	5	1	3	2	5
Disability of arms or legs or of both and of body	443	22	26	27	28	21	26	14	24	23	32	31	32	137

CLEVELAND CRIPPLE SURVEY—GENERAL TABLES

TABLE 7. *Crippled Persons Enumerated in Cleveland, October, 1915–October, 1916, Classified by Main Causes of their Physical Disability, and by Color, Nativity, and Sex*

Main Causes of Disability and Sex	Aggregate	White				Colored
		Total	Native-born	Foreign-born	Nativity Unknown	
Both sexes, all causes	*4,186*	*4,076*	*2,668*	*1,401*	*7*	*110*
Congenital	301	296	250	46		5
Accident at occupation	468	466	226	240		2
Other accident	1,323	1,290	796	493	1	33
Disease	1,962	1,897	1,313	578	6	65
Not stated	132	127	83	44		5
Male, all causes	*2,638*	*2,586*	*1,638*	*944*	*4*	*52*
Congenital	136	134	116	18		2
Accident at occupation	457	455	217	238		2
Other accident	966	946	591	354	1	20
Disease	1,013	987	676	308	3	26
Not stated	66	64	38	26		2
Female, all causes	*1,548*	*1,490*	*1,030*	*457*	*3*	*58*
Congenital	165	162	134	28		3
Accident at occupation	11	11	9	2		
Other accident	357	344	205	139		13
Disease	949	910	637	270	3	39
Not stated	66	63	45	18		3

TABLE 8. *Crippled Persons Enumerated in Cleveland, October, 1915–October, 1916, Classified by Main Causes of their Physical Disability, Age, and Sex*

Main Causes of Disability and Sex	Age at Time of Survey (Years)													
	Total	Under 5	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–55	56–60	60 and Over
Both sexes	*4,186*	*165*	*416*	*355*	*301*	*290*	*296*	*267*	*299*	*298*	*266*	*274*	*262*	*697*
Congenital	301	31	69	49	39	27	22	14	12	7	6	4	11	10
Accident at occupation	468				9	27	60	66	59	54	43	46	45	59
Other accident	1,323	3	28	56	86	112	112	101	130	114	110	115	93	263
Infantile Paralysis	525	105	189	88	45	34	20	10	13	11	4	3		3
Other disease	1,437	23	121	143	104	84	71	69	78	97	96	96	104	351
Not stated	132	3	9	19	18	6	11	7	7	15	7	10	9	11
Male	*2,638*	*88*	*219*	*208*	*169*	*187*	*223*	*184*	*218*	*209*	*185*	*191*	*172*	*385*
Congenital	136	21	34	21	12	9	11	5	4	4	2	2	3	8
Accident at occupation	457				9	27	58	62	57	53	42	46	45	58
Other accident	966	2	21	42	63	88	95	72	104	84	91	84	69	151
Infantile Paralysis	289	54	100	49	25	21	14	6	8	9	2	1		
Other disease	724	11	59	87	51	40	40	35	38	50	43	52	54	164
Not stated	66		5	9	9	2	5	4	7	9	5	6	1	4
Female	*1,548*	*77*	*197*	*147*	*132*	*103*	*73*	*83*	*81*	*89*	*81*	*83*	*90*	*312*
Congenital	165	10	35	28	27	18	11	9	8	3	4	2	8	2
Accident at occupation	11						2	4	2	1	1			1
Other accident	357	1	7	14	23	24	17	29	26	30	19	31	24	112
Infantile Paralysis	236	51	89	39	20	13	6	4	5	2	2	2		3
Other disease	713	12	62	56	53	44	31	34	40	47	53	44	50	187
Not stated	66	3	4	10	9	4	6	3		6	2	4	8	7

TABLE 9. *Crippled Persons Enumerated in Cleveland, October, 1915–October, 1916, Classified by Main Causes of their Physical Disability, Age when it Occurred, and Sex*

Main Causes of Disability and Sex	Age at Occurrence of Disability (Years)														
	Total	Birth –4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60 and Over	Not Stated
Both sexes	*4,186*	*1,400*	*352*	*294*	*252*	*250*	*259*	*216*	*179*	*188*	*182*	*161*	*133*	*273*	*47*
Congenital	301	301													
Accident at occupation	468		1	13	71	88	100	52	34	41	22	20	17	7	2
Other accident	1,323	176	144	172	121	107	90	87	77	64	62	59	50	105	9
Infantile Paralysis	525	469	40	9	3	1	1								2
Other disease	1,437	389	152	92	49	51	63	73	65	77	96	79	63	157	31
Not classified	132	65	15	8	8	3	5	4	3	6	2	3	3	4	3
Male	*2,638*	*720*	*214*	*210*	*217*	*212*	*209*	*164*	*125*	*127*	*115*	*93*	*87*	*117*	*28*
Congenital	136	136													
Accident at occupation	457			12	66	86	98	52	34	41	22	20	17	7	2
Other accident	966	91	104	148	108	98	79	75	60	48	41	36	32	38	8
Infantile Paralysis	289	259	19	5	2	1	1								2
Other disease	724	204	84	39	34	25	28	34	30	36	51	37	37	70	15
Not classified	66	30	7	6	7	2	3	3	1	2	1		1	2	1
Female	*1,548*	*680*	*138*	*84*	*35*	*38*	*50*	*52*	*54*	*61*	*67*	*68*	*46*	*156*	*19*
Congenital	165	165													
Accident at occupation	11		1	1	5	2	2								
Other accident	357	85	40	24	13	9	11	12	17	16	21	23	18	67	1
Infantile Paralysis	236	210	21	4	1										
Other disease	713	185	68	53	15	26	35	39	35	41	45	42	26	87	16
Not classified	66	35	8	2	1	1	2	1	2	4	1	3	2	2	2

CLEVELAND CRIPPLE SURVEY—GENERAL TABLES

TABLE 10. *Crippled Children from Five to Fifteen Years of Age Enumerated in Cleveland, October, 1915–October, 1916, Classified by Age and School Attendance*

Age at Time of Survey (Years)	Crippled Children from Five to Fifteen Years			
	Total	School Attendance		
		At Public School Regular Classes	At Public School Special Classes	Not at School
All ages	*771*	*415*	*110*	*246*
5– 6	89	5	5	79
6– 7	100	28	10	62
7– 8	65	26	13	26
8– 9	92	54	18	20
9–10	70	46	13	11
10–11	72	44	11	17
11–12	67	50	10	7
12–13	81	61	11	9
13–14	58	42	9	7
14–15	77	59	10	8

TABLE 11. *Crippled Children from Five to Fifteen Years of Age Enumerated in Cleveland, October, 1915–October, 1916, Classified by School Attendance and Age at Occurrence of their Physical Disability*

School Attendance	Crippled Children from Five to Fifteen Years of Age																
	Total	Age at Occurrence of Disability (Years)															
		Birth to 1	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9	9–10	10–11	11–12	12–13	13–14	14–15	Not Stated
All children	*771*	*236*	*107*	*107*	*77*	*65*	*38*	*30*	*28*	*19*	*16*	*11*	*15*	*7*	*5*	*3*	*7*
At public school (regular classes)	415	129	52	55	29	35	17	20	17	14	10	9	11	4	5	3	5
At public school (special classes)	110	33	14	18	19	8	5	2	6	2	1			1			1
Not at school	246	74	41	34	29	22	16	8	5	3	5	2	4	2			1

CLEVELAND CRIPPLE SURVEY—GENERAL TABLES

TABLE 12. *Crippled Persons Enumerated in Cleveland, October, 1915–October, 1916, Classified by Degree of Education and Age*

Age at Time of Survey (Years)	Aggregate	Degree of Education																
				Common School				High School				College				Attended	
					Born												
		Not Attending School	Illiterate	Total	America	Foreign	Still Attending	Total	Completed	Not Completed	Still Attending	Total	Completed	Not Completed	Still Attending	Professional School	Schools Not Classified
All ages	*4,186*	*347*	*282*	*3,114*	*1,627*	*872*	*615*	*238*	*79*	*116*	*43*	*43*	*20*	*20*	*3*	*12*	*150*
Under 5	165	165															
5– 9	416	182		234	13		221										
10–14	355		26	327	23		304	2			2						
15–19	301		17	211	117	4	90	61	4	18	39						12
20–24	290		14	203	175	28		32	14	17	1	5		2	3	3	33
25–29	296		10	226	182	44		23	8	14	1	7	4	3			30
30–34	267		7	218	169	49		17	10	7		5	3	2		1	19
35–39	299		19	238	157	81		18	8	10		3	2	1			21
40–44	298		32	217	154	63		20	5	15		9	5	4		3	17
45–49	266		23	212	130	82		19	7	12		4	3	1		2	6
50–54	274		21	231	113	118		15	9	6		3		3		1	3
55–59	262		26	222	113	109		7	4	3		2	1	1			5
60 and over	697		87	575	281	294		24	10	14		5	2	3		2	4

TABLE 13. *Crippled Persons over Fifteen Years of Age Enumerated in Cleveland, October, 1915–October, 1916, Classified by Occupation, Form of Disability and Sex*

Form of Disability and Sex	Crippled Persons Over Fifteen Years of Age											
	Aggregate	Occupation										Not at Work
		Total	Manufacturing and Mechanical Industries	Transportation	Trade	Public Service	Professional Service	Domestic and Personal Service	Clerical Occupation	Not Classified	Housewives	
Male	*2,123*	*1,319*	*651*	*192*	*201*	*65*	*45*	*80*	*49*	*36*		*804*
Loss of hand or arm												
One	171	136	57	23	26	8	5	8	5	4		35
Both	5	3	1		1					1		2
Defect of hand or arm												
One	375	303	181	47	35	15	3	8	7	7		72
Both	19	13	7	2	1	1		1		1		6
Loss of foot or leg												
One	388	287	123	62	38	18	10	21	12	3		101
Both	22	12	4	1			3	1		3		10
Defect of foot or leg												
One	619	401	203	45	64	17	17	30	19	6		218
Both	139	41	21	4	8	2	1	2		3		98
Loss or defect of one or both arms and one or both legs	143	31	11	4	6		1	2	3	4		112
Deformity of body	49	28	13	2	5	2	2	2	1	1		21
Paralysis of body	4	2	2									2
Not classified	22	7	1		2		1	2	1			15
Disability of arms or legs or of both and of body	167	55	27	2	15	2	2	3	1	3		112

Female	*1,127*	*593*	*77*	*10*	*24*	*1*	*16*	*44*	*21*		*400*	*534*
Loss of hand or arm												
One	13	11	1								10	2
Both												
Defect of hand or arm												
One	52	38	3		1			4	2		28	14
Both	16	7			1						6	9
Loss of foot or leg												
One	41	27	2	1	2				1		21	14
Both	5	2	1								1	3
Defect of foot or leg												
One	491	320	41	7	12	1	13	21	15		210	171
Both	107	40	4				3	6	1		26	67
Loss or defect of both arms and of one or both legs	107	45	2		2			3			38	62
Deformity of body	77	45	15	2	3			3	1		21	32
Paralysis of body	1	1									1	
Not classified	15	3	1								2	12
Disability of arms or legs or of both and of body	202	54	7		3			7	1		36	148

TABLE 14. *Crippled Persons over Fifteen Years of Age Enumerated in Cleveland, October, 1915–October, 1916, Classified by Occupation, Sex, and Age*

Age at Time of Survey and Sex	Crippled Persons Over Fifteen Years of Age											
		Occupation										
	Aggregate	Total	Manufacturing and Mechanical Industries	Transportation	Trade	Public Service	Professional Service	Domestic and Personal Service	Clerical Occupation	Not Classified	Housewives	Not at Work
Both sexes	*3,250*	*1,912*	*728*	*202*	*225*	*66*	*61*	*124*	*70*	*36*	*400*	*1,338*
15–19	301	86	44	2	17	1	1	3	9		9	215
20–24	290	196	97	8	23	6	9	11	24	1	17	94
25–29	296	215	87	29	31	6	11	11	10	6	24	81
30–34	267	212	96	25	22	4	6	9	8	1	41	55
35–39	299	225	87	26	29	9	8	14	5	4	43	74
40–44	298	220	74	19	24	9	9	14	9	7	55	78
45–49	266	193	64	20	23	9	11	22	2	3	39	73
50–54	274	185	69	21	21	6	5	16	1	6	40	89
55–59	262	157	50	25	15	6	1	12		3	45	105
60 and over	697	223	60	27	20	10		12	2	5	87	474
Male	*2,123*	*1,319*	*651*	*192*	*201*	*65*	*45*	*80*	*49*	*36*		*804*
15–19	169	49	29	2	13	1			4			120
20–24	187	134	81	4	17	5	4	9	13	1		53
25–29	223	169	78	24	30	6	7	9	9	6		54
30–34	184	145	82	24	21	4	5	3	5	1		39
35–39	218	165	79	26	28	9	5	9	5	4		53
40–44	209	152	70	19	20	9	8	10	9	7		57
45–49	185	140	62	20	21	9	10	14	1	3		45
50–54	191	133	66	21	19	6	5	9	1	6		58
55–59	172	103	48	25	13	6	1	7		3		69
60 and over	385	129	56	27	19	10		10	2	5		256

Female	*1,127*	*593*	*77*	*10*	*24*	*1*	*16*	*44*	*21*		*400*	*534*
15–19	132	37	15		4		1	3	5		9	95
20–24	103	62	16	4	6	1	5	2	11		17	41
25–29	73	46	9	5	1		4	2	1		24	27
30–34	83	67	14	1	1		1	6	3		41	16
35–39	81	60	8		1		3	5			43	21
40–44	89	68	4		4		1	4			55	21
45–49	81	53	2		2		1	8	1		39	28
50–54	83	52	3		2			7			40	31
55–59	90	54	2		2			5			45	36
60 and over	312	94	4		1			2			87	218

CLEVELAND CRIPPLE SURVEY—GENERAL TABLES

TABLE 15. *Crippled Persons over Fifteen Years of Age Enumerated in Cleveland, October, 1915–October, 1916, Classified by Occupation, Sex, and Age at Occurrence of Disability*

Age at Occurrence of Disability (Years)	Crippled Persons Over Fifteen Years of Age											
	Aggregate	Occupation										Not at Work
		Total	Manufacturing and Mechanical Industries	Transportation	Trade	Public Service	Professional Service	Domestic and Personal Service	Clerical Occupation	Not Classified	Housewives	
Male	*2,123*	*1,319*	*651*	*192*	*201*	*65*	*45*	*80*	*49*	*36*		*804*
Congenital	71	47	21	7	8	2	2	1		6		24
Under 5	252	168	91	8	36	4	7	10	10	2		84
5–9	132	87	42	6	11	6	6	5	8	3		45
10–14	177	126	63	17	21	3	5	8	7	2		51
15–19	217	170	91	18	28	6	1	9	16	1		47
20–24	212	157	85	34	12	7	7	9	1	2		55
25–29	209	137	59	31	18	11	4	9	2	3		72
30–34	164	114	50	20	17	5	7	8	2	5		50
35–39	125	86	39	13	17	4	2	6	1	4		39
40–44	127	71	35	12	12	4	1	5		2		56
45–49	115	48	20	6	9	6	1	4		2		67
50–54	93	45	27	10	3	3			1	1		48
55–59	87	31	18	4	6			2		1		56
60 and over	117	16	6	3	3	1		1		2		101
Not stated	25	16	4	3		3	2	3	1			9

Female	*1,127*	*593*	*77*	*10*	*24*	*1*	*16*	*44*	*21*		*400*	*534*
Congenital	101	56	9	2	1	1	1	4	6		32	45
Under 5	217	136	31	3	9		11	8	10		64	81
5– 9	89	50	11	4	1		1	2	3		28	39
10–14	77	46	10		3		1	7			25	31
15–19	35	23	5		4				1		13	12
20–24	38	28	3	1			1	1	1		21	10
25–29	50	34	2		1			3			28	16
30–34	52	30	1		1			4			24	22
35–39	54	23			1			3			19	31
40–44	61	38			1			3			34	23
45–49	67	33	1		1			6			25	34
50–54	68	30	1		1			2			26	38
55–59	46	20	1								19	26
60 and over	156	41	1								40	115
Not stated	16	5	1				1	1			2	11

CLEVELAND CRIPPLE SURVEY—GENERAL TABLES

TABLE 16. *Crippled Persons over Fifteen Years of Age Enumerated in Cleveland, October, 1915–October, 1916, Classified by Occupation, Weekly Wage, and Sex*

Occupation	Crippled Persons Over Fifteen Years of Age												
	Total	Weekly Wage										Not Stated	No Wage
		Under $6	$6–10	$10–15	$15–20	$20–25	$25–30	$30–35	$35–40	$40–45	$45–50		
Both sexes	*3,250*	*87*	*180*	*383*	*350*	*107*	*62*	*28*	*9*	*7*	*3*	*696*	*1,338*
Manufacturing and mechanical industries	728	33	84	184	200	78	35	13	3	2	2	94	
Transportation	202	1	19	63	65	11	8	9	1	1	1	23	
Trade	225	17	32	45	31	8	1	2	3	4		82	
Public service	66		3	38	12	2	4	1				6	
Professional service	61	5	6	8	4	3	8	1	1			25	
Domestic and personal service	124	21	23	21	11	2	1		1			44	
Clerical occupation	70	1	10	19	23	2	5	2				8	
Not classified	36	9	3	5	4	1						14	
Housewives	400											400	
No occupation	1,338												1,338
Male	*2,123*	*36*	*127*	*351*	*340*	*103*	*61*	*28*	*9*	*3*	*3*	*258*	*804*
Manufacturing and mechanical industries	651	6	58	172	197	77	35	13	3	2	2	86	
Transportation	192	1	17	58	64	9	8	9	1	1	1	23	
Trade	201	12	25	42	29	8	1	2	3			79	

Public service	65		3	38	12	2	3	1				6	
Professional service	45	1	2	7	3	2	8	1	1			20	
Domestic and personal service	80	7	16	18	11	2	1		1			24	
Clerical occupation	49		3	11	20	2	5	2				6	
Not classified	36	9	3	5	4	1						14	
Housewives													
No occupation	804												804
Female	*1,127*	*51*	*53*	*32*	*10*	*4*	*1*			*4*		*438*	*534*
Manufacturing and mechanical industries	77	27	26	12	3	1						8	
Transportation	10		2	5	1	2							
Trade	24	5	7	3	2					4		3	
Public service	1						1						
Professional service	16	4	4	1	1	1						5	
Domestic and personal service	44	14	7	3								20	
Clerical occupation	21	1	7	8	3							2	
Not classified													
Housewives	400											400	
No occupation	534												534

CLEVELAND CRIPPLE SURVEY—GENERAL TABLES

TABLE 17. *Crippled Persons from Fifteen to Sixty Years of Age Enumerated in Cleveland, October, 1915–October, 1916, Classified by Ability to Work, Form of Physical Disability, and Sex*

Form of Physical Disability	Ability to Work											
	Aggregate			Not Seriously Handicapped for Normal Occupation			Able to Work at Selected Trades and Processes			Disabled for Unaided Competition in Normal Industry		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All forms	*2,553*	*1,738*	*815*	*753*	*566*	*187*	*1,142*	*835*	*307*	*658*	*337*	*321*
Loss of hand or arm												
One	164	154	10	1		1	157	149	8	6	5	1
Both	5	5					2	2		3	3	
Defect of hand or arm												
One	376	328	48	91	84	7	267	232	35	18	12	6
Both	27	16	11	4	4		6	5	1	17	7	10
Loss of foot or leg												
One	375	341	34	198	185	13	160	144	16	17	12	5
Both	25	21	4	11	10	1	6	5	1	8	6	2
Defect of foot or leg												
One	871	512	359	384	253	131	352	192	160	135	67	68
Both	164	90	74	7	4	3	39	23	16	118	63	55
Loss or defect of one or both arms and of one or both legs	167	95	72	1	1		57	29	28	109	65	44
Deformity of body	113	45	68	44	19	25	45	19	26	24	7	17
Paralysis of body	3	2	1							3	2	1
Not classified	32	17	15	4	2	2	8	5	3	20	10	10
Disability of arms or legs or of both and of body	231	112	119	8	4	4	43	30	13	180	78	102

TABLE 18. *Crippled Persons from Fifteen to Sixty Years of Age Enumerated in Cleveland, October, 1915–October, 1916, Classified by Reasons for Unemployment, Form of their Physical Disability, and Sex*

Form of Physical Disability	Reasons for Unemployment														
	Aggregate			Need Placement at Selected Trades and Processes			Need Special Training or Special Conditions for Work			Need Home or Hospital Occupation			Not Classified for Occupation for Various Reasons		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All forms	*859*	*543*	*316*	*189*	*133*	*56*	*130*	*108*	*22*	*45*	*15*	*30*	*495*	*287*	*208*
Loss of hand or arm															
One	27	25	2	9	9		3	3		1		1	14	13	1
Both	2	2											2	2	
Defect of hand or arm															
One	66	55	11	24	21	3	15	13	2	2	2		25	19	6
Both	11	5	6	1		1	3	3					7	2	5
Loss of foot or leg															
One	77	67	10	27	25	2	15	15		1	1		34	26	8
Both	11	9	2	1		1	2	2					8	7	1
Defect of foot or leg															
One	247	158	89	98	64	34	37	30	7	10	5	5	102	59	43
Both	98	57	41	3	2	1	14	11	3	14	3	11	67	41	26
Loss or defect of one or both arms and of one or both legs	102	67	35	4	3	1	20	18	2	1		1	77	46	31
Deformity of body	48	19	29	12	6	6	10	5	5	3	1	2	23	7	16
Paralysis of body	1	1					1	1							
Not classified	24	12	12	1	1		3	3		1		1	19	8	11
Disability of arms or legs or of both and body	145	66	79	9	2	7	7	4	3	12	3	9	117	57	60

TABLE 19. *Crippled Persons over Fifteen Years of Age I*
Classified by their Means of Support, Age, and Sex

Age at Time of Survey (Years)	Aggregate	Means of Support														
		Earning a Living				Partly Self-supporting	Support by									
							Total	Income	U. S. Pension	Industrial		Family	Wholly or Partly by Relief Agencies		Begging	Not Stated
		Total	For Self	For Self and Others	Housewives					Compensation	Pension		Outdoor	Indoor		
Both sexes	*3,250*	*1,743*	*405*	*938*	*400*	*89*	*1,418*	*136*	*22*	*17*	*17*	*1,034*	*37*	*88*	*16*	*51*
15–19	301	51	33	9	9	21	229					222	1	4		2
20–24	290	175	102	54	19	16	99	3		1		89	2	2		2
25–29	296	205	69	112	24	3	88	1		4	1	69	2	4	1	6
30–34	267	197	39	117	41	9	61	6		6		46		2		1
35–39	299	215	38	133	44	6	78	4		1	1	46	9	5	4	8
40–44	298	207	32	120	55	4	87	9		2	2	49	6	9	3	7
45–49	266	179	31	109	39	8	79	6				57	3	6	2	5
50–54	274	171	22	108	41	8	95	6			1	73	2	6	4	3
55–59	262	144	16	83	45	6	112	18		1		77	3	5	2	6
60 and over	697	199	23	93	83	8	490	83	22	2	12	306	9	45		11
Male	*2,123*	*1,229*	*318*	*911*		*42*	*852*	*113*	*13*	*17*	*17*	*559*	*24*	*47*	*16*	*46*
15–19	169	33	24	9		9	127					123		2		2
20–24	187	128	81	47		4	55	2		1		48	2			2
25–29	223	163	53	110		2	58	1		4	1	40	2	3	1	6
30–34	184	137	30	107		5	42	6		6		27		2		1

35–39	218	160	29	131		2	56	3		1	1	27	8	4	4	8
40–44	209	146	28	118		1	62	8		2	2	32	4	5	3	6
45–49	185	130	22	108		6	49	5				33	1	3	2	5
50–54	191	124	18	106		4	63	5			1	46	2	2	4	3
55–59	172	95	13	82		3	74	16		1		49	1	1	2	4
60 and over	385	113	20	93		6	266	67	13	2	12	134	4	25		9
Female	*1,127*	*514*	*87*	*27*	*400*	*47*	*566*	*23*	*9*			*475*	*13*	*41*		*5*
15–19	132	18	9		9	12	102					99	1	2		
20–24	103	47	21	7	19	12	44	1				41		2		
25–29	73	42	16	2	24	1	30					29		1		
30–34	83	60	9	10	41	4	19					19				
35–39	81	55	9	2	44	4	22	1				19	1	1		
40–44	89	61	4	2	55	3	25	1				17	2	4		1
45–49	81	49	9	1	39	2	30	1				24	2	3		
50–54	83	47	4	2	41	4	32	1				27		4		
55–59	90	49	3	1	45	3	38	2				28	2	4		2
60 and over	312	86	3		83	2	224	16	9			172	5	20		2

V. Occupation Lists by Disability Occupation Studies and Stories of Street Operators

OCCUPATION AT TIME OF SURVEY OF CRIPPLES OVER FIFTEEN YEARS OF AGE CLASSIFIED BY DISABILITY

Loss of right hand—twenty-six males

- Carpenter (Building)
- Clerk (Railroad)
- Coremaker (Iron Foundry)
- Crane-hand (Machine Shop)
- Inspector
  - Lumber Company
  - Railroad
- Laborer
  - Planing Mill
  - Bakery
  - Woolen Factory
- Mining Engineer Promoter
- Painter
  - Sign
  - Contractor
- Proprietor (Small Store-keeper)
- Repairman (Woolen Factory)
- Salesman
  - Oil Refinery
  - Father's store
- Saloon keeper
- Shipping Clerk (Iron Foundry)
- Sorter (Bag Factory)
- Street Musician
- Street Operating (Begging)
- Superintendent (Furniture Factory)
- Telephone Operator (Railroad)
- Watchman (City Employee)
- Weigher (Steel and Wire Factory)

Loss of right arm below elbow—fifteen males

- Baggage-master (Railroad)
- Laborer
  - City
  - Iron Foundry
- Meter-reader (Valve and Nut Factory)
- News-agent (Train)
- Painter (Building)
- Proprietor (Mover)
- Proprietor
  - Moving-picture Theater
  - Small Store-keeper
- Sander (Chair Factory)
- Signal Timer
  - Engineering Company
  - Telegraph Service
- Street Operating (Begging)
- Switchman (Railroad)

Loss of right arm above elbow—fifty-six males

- Agent
  - Real Estate
  - Insurance
- Bill Collector (Retail Furniture Store)
- Car Inspector (Railroad)
- Clerk (Railroad)
- Elevator Operator (Real Estate)
- Fireman (Railroad)
- Foreman (Docks)
- Hardwood Finisher (Beer Pump and Soda Fountain Factory)

- Laborer
  - Iron Foundry
  - Nut and Bolt Factory
  - Sash and Door Factory
  - Stockyard
- Locksmith
- Messenger (Telegraph Company)
- Painter
  - Automobile
  - Building
- Peddler
  - Dry Goods
  - Fruit and Vegetables
- Presser (Tailor)
- Proprietor
  - Iron Foundry
  - Paper-hanger
  - Restaurant
  - Repairer of Automobiles and Installer of heaters
- Rag Picker (Junk Dealer)
- Salesman
  - Chemical Factory
  - Perfume
- Salesman
  - Sewing Machine Factory
- Sorter (Blanket Factory)
- Stationary Engineer (Candy Factory)
- Stove Tender (Blast Furnace)
- Superintendent
  - Coke Plant
  - Electrical Supply Factory
- Supervisor (Telegraph Company)
- Switchman (Railroad)
- Teamster (Mover)
- Telegrapher (Telegraph Company)
- Train Despatcher (Railroad)
- Watchman
  - Automobile Factory
  - Electrical Supply Factory
  - Iron Foundry
  - Railroad
- Weighmaster (Coke Plant)
- Yardmaster (Railroad)

Loss of left hand—sixteen males

- Agent (Retail Furniture Store)
- Bartender (Saloon-keeper)
- Delivery Man (Factory)
- Elevator Operator
- Foreman (Contractor)
- Furnace Recorder (Nut and Bolt Factory)
- Handy Man (Steel and Wire Factory)
- Janitor (Real Estate)
- Laborer (Cement Factory)
- Machine-hand (Iron Foundry)
- Presser (Tailor)
- Pressman (Straw and Felt Hat Factory)
- Proprietor (Contractor)
- Salesman (Oil Refinery)
- Watchman
  - Hotel
  - Public Buildings

Loss of left arm below elbow—eleven males

- Billet Inspector (Steel and Wire Factory)
- Cost Accountant (Brass Bed Factory)
- Driver (Livery Keeper)
- Fireman (Box Factory)
- Painter (Steeple Jack)
- Proprietor (Small Store-keeper)
- Street Inspector (City)
- Telegraph Operator (Railroad)
- Time-keeper (Iron Foundry)
- Watchman (Furniture Factory)

Loss of left arm above elbow—thirteen males

- Bill Collector (City)
- Bookkeeper, Assistant (City)
- Bridge Captain (City)
- Elevator Operator (Building)
- Garbage Collector (City)
- Janitor (Theater)

Janitor (Building)
Notary Public
Sewer Inspector (City)
Street Operating (Begging)
Water Meter Reader (City)

Defect of right hand (including loss of thumb or two or more fingers)—one hundred and thirty-four males

- Barber (Proprietor)
- Barn Boss (Wholesale Building and Supply Company)
- Bill Collector (Retail Furniture Store)
- Blacksmith (Steam Railroad)
- Blacksmith's Helper (Iron Foundry)
- Boilermaker (Steam Railroad Shops)
- Boltmaker (Nut, Bolt and Rivet Factory)
- Bottom Maker (Steel and Wire Factory)
- Brakeman (Steam Railroad)
- Cabinet-maker (Brewery)
- Carpenter (Builder)
- Casting Grinder (Iron Foundry and Machine Shop Products)
- Chauffeur
  - Automobile Livery
  - Furniture Factory
- Clerical Work (Automobile Factory)
- Clerk
  - Grocery Store
  - Iron Foundry and Machine Shop Products
  - Meat Market
  - Steel Factory
- Cold Nut Presser (Nut, Bolt and Rivet Factory)
- Conductor (Railroad)
- Core-maker (Iron Foundry and Machine Shop Products)
- Delivery-man (Tea Company)
- Drill Press Operator
  - Automobile Factory
  - Iron Foundry and Machine Shop Products
  - Nut, Bolt and Rivet Factory
  - Steel and Barrel Factory
- Elevator Operator (City)
- Engineer (Paint Factory)
- Fireman (Boiler and Tube Welding Factory)
- Foreman
  - Bedstead Factory
  - Railroad
  - Umbrella Factory
- Gear Cutter (Iron Foundry and Machine Shop)
- Grinder (Brass Foundry)
- Handy-man (Steel and Wire Factory)
- Heater (Iron Foundry)
- Helper
  - Lamp Factory
  - Stove Factory
- Hoisting Engineer (Building)
- Inspector
  - Iron Factory
  - Railroad
- Janitor
- Labeller (Paint Factory)
- Laborer
  - Automobile Factory
  - Can Factory
  - City
  - Contractor
  - Lumber Yard
  - Iron Foundry
  - Oil Refinery
  - Railroad
  - Wire Factory
- Lathe Hand
  - Automobile Factory
  - Iron Foundry
  - Machine Shop Products
  - Steam Trap Factory
- Machine Operator (Garment Factory)
- Molderer
  - Brass Foundry
  - Electrical Supply Factory
  - Iron Foundry
- Painter (Paint Factory)

- Painter (Railroad)
- Paper-hanger (Building)
- Peddler
  - Fruit
  - Rag
- Pharmacist (Drug Store)
- Planer-hand (Iron Foundry)
- Plumber
- Polisher and Buffer
- Porter
  - Chemical Factory
  - Steel and Wire Factory
- Proprietor (Small Store-keeper)
- Punch Press Operator
- Rag Picker (Junk Dealer)
- Real Estate Agent
- Repair-man
  - Automobile Factory
  - Iron Foundry
  - Machine Shop Products
  - Railroad
- Rim-maker (Automobile Factory)
- Salesman
  - Awning Factory
  - Cigar Company
- Salesman (Hat Factory)
- Scraper (Painter)
- Signal Timer (Railroad)
- Stock-room Hand (Steel and Wire Factory)
- Street Operating (Begging)
- Superintendent (Cemetery)
- Switchman (Railroad)
- Teacher of Languages
- Teamster
  - Brewery
  - Brick and Tile Factory
  - Contractor
  - Express Company
  - Furniture Movers
- Tool-maker (Automobile Factory)
- Watch-man
  - Car Company
  - Factory
- Water Tender (Manufacturing Power and Light)
- Wire Weaving (Steel and Wire Factory)

Defect of left hand (including loss of thumb or two or more fingers) —one hundred and thirty-seven males

- Agent (Insurance Auto Protection Company)
- Ash Collector (City)
- Assembler (Oil Refinery)
- Baggage-man (Railroad)
- Barber
- Bartender (Saloon)
- Bench-hand
  - Automobile Factory
  - Furniture Factory
- Blacksmith (Street Railway Machine Shop)
- Carpenter
  - Building
  - Chemical Factory
  - Iron Foundry
  - Electrical Supply Factory
  - Street Railway Company
- Clerk (Telegraph Company)
- Collector (Electric Fixture Store)
- Conductor (Railroad)
- Crane-hand (Iron Foundry)
- Chauffeur (Building)
- Chauffeur
  - Auto truck for meat market
- Cover-maker (Iron Foundry)
- Die-maker (Iron Foundry)
- Duffer Boss (Woolen Factory)
- Drill Press Operator
  - Oil Stove Factory
  - Machine Shop Products
- Driver (Retail Creamery)
- Electrician (Automobile Factory)
- Elevator Operator (Welding Factory)
- Enameler (Paint Factory)
- Engineer
  - Iron Foundry
  - Steel and Wire Factory
- Finisher (Iron Foundry)
- Fireman
  - Railroad
  - Nut, Bolt and Rivet Factory

- Foreman
  - Automobile Factory
  - Electrical Supply Factory
  - Can Factory
  - Iron Foundry
  - Steel and Wire Factory
- Horseshoer
- Inspector (Iron Foundry)
- Janitor
  - School
  - Dispensary
- Laborer
  - Brickyard
  - City
  - Iron Foundry
  - Steam Railroad
- Lathe Hand
  - Automobile Factory
  - Iron Foundry
  - Electrical Supply Factory
- Latherer (Building)
- Letter Carrier (U.S. Government)
- Machinist
  - Iron Foundry
  - Nut and Bolt Factory
  - Electrical Supply Factory
- Machine Hand (Brick and Tile Factory)
- Manager (Clothing Store)
- Mechanical Drawing (Beer Pump and Soda Fountain Factory)
- Millwright (Sash and Door Factory)
- Molderer
  - Brass Factory
  - Tin Factory
- Mover (Helper)
- Oven Man (Bakery)
- Packer
  - Brewery
  - Paint Factory
- Painter
- Pattern-maker
  - Automobile Factory
  - Iron Foundry
- Policeman (Special, Steam Railroad)
- Press Room Apprentice (Printing)
- Probation Officer (City)
- Proprietor
  - Automobile Livery
  - Builder
  - Contractor
  - Carriage-maker
  - Real Estate
  - Small Store-keeper
- Punch Press Operator (Iron Foundry)
- Repair-man
  - Ice Cream Company
  - Railroad Carshops
- Salesman (Grocery store)
- Sawyer
  - Iron Foundry
  - Burial Case Factory
- Saw Filer (Furniture Factory)
- Screw Machine Hand (Oil Stove Factory)
- Shipping Clerk (X-Ray Company)
- Steel Press Operator (Iron Foundry)
- Street Operating (Begging)
- Superintendent (Circulation Department of Newspaper)
- Superintendent (Plasterer)
- Switchman (Railroad)
- Teamster
  - Express Company
  - Furniture Factory
  - Building Supply Company
- Tester (Automobile Factory)
- Varnish Finisher (Automobile Factory)
- Watch-man
  - City
  - Electrical Supply Factory
  - Steel and Wire Factory
  - Railroad
- Weigher (Steel and Wire Factory)
- Wood Worker (Cabinet Factory)
- Yardman (Railroad)

Defect of right arm—nineteen males

- Bartender (Saloon)
- Barrel Repairer
- Basket-maker
- Bookkeeper (Iron Foundry)
- Cartoonist (Advertising Company)
- Clerk (Billing, Iron Foundry)

Clerical Work (Iron Foundry)
Delivery-man (Bakery)
Drafting (Automobile Factory)
Fire Inspector (City)
Furniture Finisher (Furniture Factory)
Janitor (Steel and Wire Factory)
Lodging-house Keeper
Proprietor (Small Store-keeper)
Repairman
Street Cleaner (City)
Street Operating (Begging)
Target Operator (Railroad)
Teamster (Express)
Weigher (Steel and Wire Factory)

Defect of left arm—eleven males

Cigar-maker
Die-maker (Iron Foundry)
Drill Press Operator (Awning Factory)
Proprietor (Furniture and Undertaker)
Shipping Clerk (Wholesale Provision and Packing Company)
Street Operating (Begging)
Telegrapher (Telegraph Service)
Timekeeper (Iron Foundry)
Weigher

Loss of both arms above elbow—three males

Lawyer (Judge)
Peddler (Drives coal team with reins about neck)
Street Operating (Begging)

Defect of both hands (including loss of thumb or two or more fingers on both hands)—eleven males

- Carpenter
  - Contractor
  - Automobile Factory
- Engineer
  - Paper Mill
  - Hospital
- Freight-handler (Railroad)
- Laborer (Nut, Bolt and Rivet Factory)
- Small Store-keeper
- Street Operator (Begging)
- Towerman (Railroad)
- Watchman (Manufacturing Power and Heat)
- Water-meter Reader (City)

Defect of both arms[1]—three males

Painter
Salesman
Solicitor

Loss of foot or leg—two hundred and eighty-seven males

Accountant
Agent (Charitable Society)
Agent (Dry Cleaning Company)
Assembler (Automobile Factory)

---

[1] One congenital lack of right arm and undeveloped left arm.
One, both arms stiff and unable to raise them.
One, both arms paralyzed (one completely useless).

- **Assembler**
  - **Sewing Machine Factory**
  - **Stove Factory**
- **Artificial Limb Maker (Artificial Limb Manufacturing)**
- **Baggageman (Railroad)**
- **Barber**
- **Bartender**
- **Bench Hand (Jewelry Manufacturing)**
- **Bookkeeper**
  - **Automobile Factory**
  - **Bank**
  - **Window Glass Factory**
- **Brakeman (Railroad)**
- **Brassworker (Brass Factory)**
- **Bridge Captain (City)**
- **Bridge Engineer (Railroad)**
- **Carpenter (Builder)**
- **Cement Maker (Builder)**
- **Chauffeur (Truck, Movers' Retail Store)**
- **Chef (Restaurant)**
- **Cigar-maker (Cigar Factory)**
- **Clergyman**
- **Clerk**
  - **City**
  - **Garage**
  - Railroad
  - Retail Store
- Clerk (Billing, Iron Foundry and Machine Shop Products)
- Clerical Work (Iron Foundry)
- Cobbler (Shoemaking)
- Conductor (Railroad)
- Coremaker
  - Beer Pump and Soda Fountain Factory
  - Iron Foundry and Machine Shop Products
- Crane-man (Machine Shop)
- Delivery-man (Ice Cream Company)
- Diemaker
  - Iron Foundry
  - Steel and Wire Factory
- Draftsman
- Drill Grinder (Steel and Wire Factory)
- **Drill Press Operator**
  - **Iron Foundry**
  - **Nut, Bolt and Rivet Factory**
  - **Plumbers' Supply Factory**
- **Driver**
  - **Factory**
  - **Railroad**
- **Editor (Newspaper)**
- **Elevator Operator**
  - **City**
  - **Iron Foundry**
  - **Real Estate Company**
- **Engineer**
  - **Stationary**
  - **Automobile Factory**
  - **Hoisting**
  - **Builder**
  - **Railroad**
- **Errand Boy**
  - **Lawyer**
  - **Screw and Tack Factory**
- **Filer (Brass Fixture Factory)**
- **Finisher (Furniture Factory)**
- **Flagman (Railroad)**
- **Foreman**
  - **Builder**
  - **Electric Supply Factory**
  - **Iron Foundry and Machine Shop Products**
  - Railroad
- Freight Handler (Railroad)
- Gateman (Railroad)
- Grinder
  - Iron Foundry
  - Lamp Factory
  - Screw and Tack Factory
- Handy Man (Hat Factory)
- Helper
  - Furniture Factory
  - Iron Foundry
- Hoisting Machine Operator (Builder)
- Inspector
  - Automobile Factory
  - Iron Foundry
- Janitor (Department Store)
- Laborer
  - Brick Factory
  - City
  - Iron Foundry
  - Livery Keeper
  - Machine Shop

- Laborer
  - Nut, Bolt and Rivet Factory
  - Stove Factory
- Lathe Hand (Machine Shop)
- Leather Worker (Artificial Limb Company)
- Lineman (Railroad)
- Machine Hand (Oil Stove Factory)
- Machine Operator
  - Moving Picture Theater
  - Iron and Steel Factory
  - Rubber Factory
- Manager
  - Artificial Limb Company
  - Telegraph Company
- Mason (Builder)
- Molderer (Electrical Supply Factory)
- Office Work (Iron Foundry)
- Painter (Builder)
- Patrolman (Power and Light Manufacturing)
- Pattern-maker
  - Carbon Factory
  - Iron Foundry and Machine Shop Products
- Peddler (Fruit)
- Planer Hand (Iron Foundry and Machine Shop Products)
- Plumber (Retail Spring Company)
- Press Feeder (Electric Supply Factory)
- Press Hand (Automobile Factory)
- Printer
  - Cigar Box Factory
  - Printer
- Proprietor
  - Cigar Factory
  - Contractor
  - Express Company
  - Rule Factory
  - Saloon-keeper
  - Store-keeper
  - Shoemaker
  - Tailor
- Punch Press Operator (Iron Foundry and Machine Shop Products)
- Repair-man
  - Automobile Factory
  - Artificial Limb Company
- Repair-man
  - Can Factory
  - Iron Foundry
  - Railroad
  - Telegraph Company
- Riveter (Structural Iron Works)
- Salesman
  - Automobile Factory
  - Cheese Factory
  - Sash and Door Factory
- Secretary and Treasurer
  - Automobile Factory
  - Oil Refinery
- Shaper Hand (Metal Factory)
- Shearman (Rod Factory)
- Signal Timer (Railroad)
- Sorter
  - Automobile Factory
  - Iron Foundry
- Station Agent (Railroad)
- Stamp Collector
- Stock-keeper (Sweater Factory)
- Store-keeper (Railroad)
- Street-trade
  - Musician
  - Newspaper
- Street Operating (Begging)
- Superintendent (Steel and Wire Factory)
- Switchman (Railroad)
- Tailor (Shop)
- Teamster
  - Brewery
  - Coal Company
  - Express
  - Junk Dealer
- Telegraph Editor
- Telegraph Operator (Telegraph Company)
- Tester (Stove Factory)
- Time-keeper
  - Automobile Factory
  - Iron Foundry
- Tool-maker (Wire Factory)
- Tool-setter (Washer Factory)
- Watchman
  - City
  - Nut, Bolt and Rivet Factory
- Wire Cutter (Iron Foundry and Machine Shop Products)

Loss of both feet—two males

- Carpenter
- Time-keeper (Railroad)

Loss of both legs—one male

- Salesman (Artificial Limb Company)

Loss of both legs below knee—eleven males

- Cashier (Theater)
- Clerk (Brotherhood Railroad Men)
- Elevator Operator
- Punch Press Operator (Automobile Factory)
- Roller (Cigar Factory)
- Street Operating (Begging)
- Teacher of Music

Defect of one foot or leg—four hundred and one males

- Accountant
- Agent
  - Insurance
  - Real Estate
  - Advertising
  - Oil Company
- Apparatus Tender (Coke Factory)
- Apprentice
  - Iron Foundry
  - Tailor
- Architect
- Assembler
  - Automobile Factory
  - Stove Factory
- Awning Hanger (Awning Factory)
- Barber
- Bartender (Saloon-keeper)
- Bench Hand (Sewing Machine Factory)
- Blacksmith's Assistant (Iron Foundry)
- Book-keeper
- Brakeman (Railroad)
- Bridge Captain (City)
- Broom-maker (Broom Factory)
- Button Dipper (Button Factory)
- Cashier
- Cabinet-maker (Wholesale Furniture Company)
- Carpenter
  - Building
  - Electrical Supply Company
  - Jobbing
  - Rod Mill
- Chauffeur
  - Automobile Factory
  - Automobile Livery
  - Iron Foundry
- Choreman (Houses)
- Cigar-maker (Factory)
- Claim Agent (Railroad)
- Cleaning Man
  - Houses
  - Department Store
- Clerical Work
- Clerk
  - Billing (Railroad)
  - City
  - Chief (Railroad)
  - Post-office
  - Shipping Grocery Store
  - Film Exchange
- Clerk (Night, Telegraph Company)
- Cobbler (Shoemaker)
- Color Artist (Lithographing and Printing)
- Compositor (Lithographing and Printing)
- Concrete Mixer
- Cooper (Oil Refinery)
- Core-maker
  - Iron Foundry
  - Electric Supply Factory
- Crane Operator
  - Iron Foundry and Machine Shop Products
  - Nut, Bolt and Rivet Factory
- Custodian
  - Board of Education Building

- Custodian (Office Building)
- Cutter (Garment Factory)
- Cylinder Pressman (Printers)
- Delivery man
  - Factory
  - Film Exchange
  - Grocery Store
- Dentist
- Doctor
- Driller (Contractor)
- Drill Press Operator
  - Machine Shop Products
  - Stove Factory
- Electrician
  - Automobile Factory
  - Ice Cream Company
- Electric Welder (Automobile Factory)
- Elevator Operator
  - Automobile Factory
  - Building
  - City
  - Furniture Store
  - Lithographer and Printer
- Engineer (Chief and Stationary, Manufacturing Chemist)
- Engineer
  - Provision Company
  - Railroad
- Errand Boy
  - Grocery Store
  - Tailor
- Finisher (Automobile Factory)
- Foreman
  - Elevator Operators, Office Building
  - Electrical Supply Factory
  - Furniture Factory
  - Iron Foundry
  - Upholstering Factory
- Fireman (Locomotive, Railroad)
- Flagman (Railroad)
- Folder Operator (Can Factory)
- Freight Handler (Railroad)
- Garbage Collector (City)
- Gateman (Railroad)
- Glazier (Building)
- Grinding Machine Operator
  - Iron Foundry and Machine Shop Products
  - Nut and Bolt Factory
- Handy-man (Building)
- Harness-maker (Harness-makers)
- Heater (Steel and Wire Factory)
- Helper
  - Electrical Supply Factory
  - Bridge Construction
  - Railroad
  - Stove Factory
- Hod Carrier (Building)
- Horseshoer
- Inspector (Milk, City)
- Inspector
  - Automobile Factory
  - Iron and Steel Factory
  - Railroad
- Janitor (Office Building)
- Laborer
  - Automobile Factory
  - Bridge
  - Carshop
  - Coal Company
  - Contractor
  - Iron Foundry
  - Lumber Company
  - Nut and Bolt Factory
  - Oil Factory
  - Plumbers' Supply Factory
  - Railroad
  - Rubber Factory
  - Steel and Wire Factory
  - Street and Stable
  - Tin Can Factory
- Lathe Hand
  - Carshop
  - Steel Factory
- Lawyer
- Lineman (Telephone Company)
- Locksmith
- Lodging-house Keeper
- Machine Feeder
- Machine Hand
  - Nut and Bolt Factory
  - Sash and Door Factory
- Machine Operator
  - Automobile Factory
  - Iron Foundry and Machine Shop Products

- Machine Operator
  - Moving Picture Theater
  - Nut and Bolt Factory
  - Furniture Factory
- Machinist
  - Automobile Factory
  - Iron Foundry
- Manager
  - Grocery Store
  - Pool Room
- Marble Polisher (Marble Works)
- Melter (Iron Foundry)
- Molderer (Iron Foundry and Machine Shop Products)
- Motorman (Railroad)
- Office Work
- Packer
  - Hardware Company
  - Mill and Railroad Supply
  - Nut, Bolt and Rivet Factory
  - Paint Factory
- Painter (Painting)
- Patternmaker (Iron Foundry and Machine Shop Products)
- Peddler
  - Fruit
  - Pencils
- Photographer
  - Factory
  - Newspaper Publisher
- Planer Hand (Iron Foundry and Machine Shop Products)
- Plumber
- Pipe Fitter (Electric Supply Factory)
- Porter
  - Lodging House
  - Sewing Machine Factory
- Presser (Clothing Factory)
- Printer (Printing)
- Proprietor
  - Carpet-weaving
  - Clothing Factory
  - Contractor
  - Express
  - Laundry
  - Painting
  - Phonograph Store
  - Piano Tuning
  - Poultry Farm
- Proprietor
  - Printing
  - Real Estate
  - Small Grocery Store
  - Shoemaking
  - Tailor
- Punch Press Operator (Iron Foundry and Machine Shop Products)
- Repairman
  - Automobile Factory
  - Furniture Factory
  - Jewelry Factory
  - Railroad
- Riveter (Automobile Factory)
- Roofer (Contractor)
- Salesman
  - Clothing Factory
  - Grocery Company
  - Paint Factory
- Sales Manager
  - Carbon Factory
  - Real Estate
- Sailor
- Screw Machine Operator (Nut, Bolt and Rivet Factory)
- Shaper (Freezing Machine Factory)
- Shipping Clerk (Sheet and Tin Plate Factory)
- Shoemaker (Retail Shoe Store)
- Solderer (Chemical Company)
- Sorter
  - Clothing Factory
  - Iron Foundry and Machine Shop Products
- Steam Fitter and Helper
  - Automobile Factory
  - Coke Oven Factory
- Stock-Room Hand
  - Iron Foundry and Machine Shop Products
  - Oil Stove Factory
  - Vacuum Cleaning Company
- Stenographer
- Street Operating (Begging)
- Street-trade (Newspapers)
- Switchman (Railroad)
- Superintendent and Assistant
  - Contractor
  - Insurance Company

- Supervisor (Wholesale Provision and Packing House)
- Switchboard Operator (Electrical Supply Factory)
- Tailor
- Teamster
  - Contractor
  - Express
  - Brick and Tile Factory
  - Paper Box Factory
  - Wholesale Builders' Supply Company
- Telegrapher (Telegraph Company)
- Telephone Operator (City Fire Department)
- Tinner (Sheet and Metal Factory)
- Tool-maker (Brass Factory)
- Transfer Agent (Railroad)
- Typesetter (Printer)
- Varnisher (Furniture Factory)
- Watchman
  - Office Building
  - Iron and Steel Foundry
  - Railroad
  - Retail Clothing Store
  - Retail Ice Company
  - Varnish Factory
  - Wooden Box Factory
- Weigher (Steel and Wire Factory)
- Welder (Car Factory)
- Wire-drawer (Electric Lamp Factory)
- Wood Paddle-maker (Wood Pattern Factory)
- Woodworker (Railroad Carshops)
- Yard Boss (Iron Foundry and Machine Shop Products)

Defect of both feet or both legs—forty-one males [2]

- Barn Man (Railroad)
- Bolt Machine Operator (Nut, Bolt and Rivet Factory)
- Carpenter (Building)
- Chauffeur (Retail Mills)
- Draftsman (Iron Foundry)
- Elevator Operator
  - City
  - Wholesale Millinery
- Fireman (Steel and Wire Factory)
- Foreman (Railroad)
- Graining
- Handy Man (Cloak Factory)
- Helper (Iron Foundry)
- Janitor (City)
- Laborer (Iron Foundry)
- Laborer (Oil Refinery)
- Notary Public
- Proprietor
  - Cigar-maker
  - Contractor
  - Loan Broker
  - Small Store-keeper
  - Tailor
- Repair man
  - Automobile Factory
  - Sewing Machine Factory
- Shipping Clerk (Brass Foundry)
- Street Operating (Begging)
- Street Trade
  - Newspaper
  - Shoe-shining Stand [3]
- Tailor
- Teamster (Contractor)
- Ticket Agent (Railroad)
- Tool Maker (Learning, Machine Shop Products)

Defect of one or both arms and one or both legs—thirty-one males

- Bookkeeper
- Broker (Commission for Bankers)
- Car Cleaner
- Caretaker (Cemetery)
- Carpenter (Building)
- Carpet Weaver

---

[2] These disabilities represent lameness or paralysis, and involve use of one or two crutches, one or two canes, braces or wheel chair.

[3] Wheel chair case.

Chauffeur (Bakery)
Clerk (Efficiency, Iron Foundry and Machine Shop Products)
Clerk (Insurance, Brotherhood)
Elevator Operator (Factory)
Foreman (Sub, Chemical Factory)
Grainer (Painter)
Laborer (Factory)
Messenger (Telegraph Company)
Peddler (Fruit)
Porter (Ice Cream Company)
Proprietor
  Restaurant
  Small Store-keeper
Sausage-maker (Packing House and Provision Company)
Street Operating (Begging)
Street Trade (Newspaper)
Stock-keeper (Nut, Bolt and Rivet Factory)
Teamster (Contractor)
Watchman (Steel and Wire Factory)

Deformity of body—twenty-eight males

Bookkeeper
Clerk (Record, Railroad)
Delivery-man (Paint Factory)
Draftsman
Driver (Creamery)
Elevator Operator (City)
Helper
  Bedstead Factory
  Box Factory
Laborer
  Florist
  Street Department, City
Machine Operator (Grinding Machine, Machine Shop Products)
Machine Operator (Sweater Factory)
Office Boy (Charitable Agency)
Proprietor
  Drug Store
  Pool Room
  Tailor
  Upholsterer
Punch Press Operator (Gasoline Engine Factory)
Repairman (Railroad)
Roller (Cigar Factory)
Salesman (Cigar Factory)
Stitcher (Clothing Factory)
Stock-room Hand (Overall Factory)
Street Trade (Newspaper)

Paralysis of body—two males [4]

Proprietor (Motor Boat Supply)
Proprietor (Wine Maker)

Deformity not classified—seven males

Bookkeeper
Canvasser
Choreman
Lodging-house Keeper
Stamp Collector
Teacher of Music
Watchman (Clothing Factory)

Loss or defect of arms or legs or of both and of body—fifty-five males

Agent
  Coal Company
  Insurance Company
Baster (Tailor)
Canvasser
Carpenter (Building)
Clerical Work (Office)
Clerk (Grocery Store)
Call Clerk (Railroad)
Coat-maker (Clothing Factory)
Conductor (Railroad)

---

[4] Use crutches.

- Custodian (Iron and Steel Foundry)
- Delivery-man (Meat-market)
- Doctor
- Draftsman
- Elevator Operator (Real Estate)
- Errand Boy (Furniture Factory)
- Fireman (Brewery)
- Helper
  - Iron Foundry
  - Oil Stove Factory
  - Sewing Machine Factory
- Inspector
- Janitor
- Laborer (City)
- Lathe Hand (Electrical Supply Factory)
- Machine Operator
  - Clothing Factory
  - Iron Foundry and Machine Shop Products
- Machine Tender
- Painter
  - Automobile Factory
  - Electric Sign Factory
- Paper-hanger
- Proprietor
  - Cigar Manufacturing
  - Motor Boat Supplies
  - Small Store-keeper
- Repair-man
  - Bicycle Shop
  - Jobbing
- Street Operating (Begging)
- Street Trade (Newspaper)
- Teamster (Trunk Factory)
- Tester (Steel Plate Factory)
- Watch-man
  - Candy Factory
  - Contractor
- Wood Finisher (Furniture Factory)

Loss of right hand—four females

Housewife

Loss of right arm below elbow—one female

Housewife

Loss of right arm above elbow—three females

Housewife

Loss of left hand—one female

Housewife

Loss of left arm below elbow—one female

Housewife

Loss of left arm above elbow—one female

Housewife

Defect of right hand—fifteen females

Dressmaking at home
Helper (Woolen Factory)
Housewife
Servant

Defect of right arm—three females

Boarding-house Keeper
Housewife

Defect of left hand—nine females

Forewoman (Factory)
Housewife

Defect of left arm—eleven females

Cashier (Department Store)
Clerical Work (Varnish Factory)
Clerk (Small Store)
Housewife
Servant

Defect of both hands—two females

Housewife

Defect of both arms [5]—four females

Housewife

Loss of one foot or leg—twenty-seven females

- Dressmaker
  - At Home
  - In Shop
- Housewife
- Small Store-keeper
- Stenographer

Loss of both legs below knee—two females

- Dressmaker (At Home)
- Housewife

Defect of one foot or leg—three hundred and twenty females

- Baster (Clothing Factory)
- Bookkeeper
- Box-maker
  - (Chewing-gum Factory)
- Buttonhole Trimmer (Buttonhole Works)
- Cashier
  - Department Store
  - Moving Picture Theater
- Check Auditor (Department Store)
- Cleaning Woman (Building)
- Clerical Work
- Clerk (File, Lawyer's Office)
- Deputy Clerk (Court House)
- Dressmaking
  - At Home
  - In Shop
- Fancy-needlewoman (Factory)
- Hand-sewer (Shirtwaist Factory)
- Helper (Grocery Store)
- Housewife
- Labeller (Cigar Factory)
- Laundress (Private Families)
- Lodging-house Keeper
- Machine Operator
  - Clothing Factory
  - Paper Box Factory
- Mangler (Laundry)
- Mender (Garment Factory)
- Minister (Spiritualist)
- Office Work
- Packer
  - Bag Factory
  - Noodle Factory
  - Wholesale Grocery Company
- Presser (Garment Factory)
- Proprietor
  - Real Estate
  - Small Grocery Store
- Repairer (Dry Cleaning Works)
- Servant
- Sorter
  - Nut, Bolt and Rivet Factory
  - Paper Stock Company
  - Sweater Factory
- Stenographer
- Switchboard Operator (Telephone Company)
- Teacher (Music)
- Teacher
  - School
  - Stenography
- Telegrapher (Telegraph Company)
- Telephone
  - Operator, Telephone Company
- Telephone
  - Recorder, Telephone Company
- Trimmer
  - Millinery Company
  - Sweater Factory
- Waitress (Restaurant)

---

[5] 3 deformity of both arms—stiff.
1 tuberculous bones in both arms.

Defect of both feet or both legs—thirty-eight females

- Bookkeeper (Overall Factory)
- Cashier (Bath House)
- Chambermaid (Lodging-house)
- [6]Hand Embroiderer
- [6]Hand Sewing
  - Dressmaking at Home
  - Dressmaking in Shop
- Housewife
- Lodging-house Keeper
- Teacher of Music

Loss or defect of one or both arms and of one or both legs—forty-five females

- Housewife
- Lodging-house Keeper
- Packer (Iron Foundry and Machine Shop Products)
- Peddler
- Practical Nurse
- Server (Restaurant)
- Stock-room Girl (Iron Foundry and Machine Shop Products)

Deformity of body—forty-five females

- Cashier (Restaurant)
- Charwoman
- Cutter (Clothing Factory)
- Folder (Sweater Factory)
- Helper (Bag Factory)
- Housewife
- Machine Operator (Garment Factory)
- Mender (Sweater Factory)
- Packer (Macaroni Factory)
- Salesgirl (Department Store)
- Servant
- Sewing
  - At Home
  - In Shop
- Sorter (Junk Dealer)
- Stenographer
- Stitcher (Clothing Factory)
- Stock-room and Order Girl (Electrical Contractors)
- Tailor
- Telephone Operator (Telephone Company)

Paralysis of body—one female

- Housewife

Deformity of body (not classified)—three females

- Dressmaking (at Home)
- Housewife

Defect of arms or legs or of both and of body—fifty-four females

- Agent (Real Estate)
- Chair Caner
- Cleaning Woman
- Clerical Work and Filing (Automobile Factory)
- Housewife
- Lodging-house Keeper
- Proprietor (Small Store-keeper)
- Salesgirl (Shoe Store)
- Sewing
  - At Home
  - In Shop
- Trimmer (Millinery Company)
- Waitress (Restaurant)

---

[6] Wheel chair cases.

OCCUPATION STUDIES

Occupation of Males from Fifteen to Sixty Years of Age, Crippled by Loss of Right Hand

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
3,609	56	26	Carpenter	Carpenter 'Roughing it', 3 years	Not stated	Not stated	$15–$20 week	Shooting accident
2,193	50	29	Railroad conductor (freight)	Clerk (engineers' accountant office), 9 years	Yes	Not stated	$75 month	Railroad accident at occupation
2,885	46	25	Coremaker (iron and steel works)	Coremaker, 21 years	Yes	$20–$25 week	$20–$25 week	Accident at occupation
1,638	33	22	Coremaker (iron and steel works)	Cranehand (iron foundry), 4 years	No	Not stated	$10–$15 week	Accident at occupation
2,857	55	14	Planing mill	Inspector and salesman (lumber), 30 years	No	Not stated	$17 week	Accident at occupation
2,963	45	12	None	Inspector (street railway) 22 years	No	None	$100 month	Railroad accident
582	21	20	Laborer (bakery)	Laborer (bakery), 1½ years	Yes	Not stated	$13 week	Accident at occupation
2,836	52	40	Laborer (factory)	Laborer (factory), 11 years	Yes	$12 week	$11 week	Accident at occupation
2,824	52	20	Painter	Painter, 31 years	No	Not stated	$75 month	Railroad accident

1,839	29	23	'Hammer-man' (shops)	Painter (sign factory), 3½ years	No	$24 week	$11 week	Accident at occupation
2,788	37	30	Printer (proprietor)	Printer—proprietor Promoter—mining engineer	Yes	Not stated	Not stated	Accident
3,058	51	37	Laborer (coal-mine)	Laborer (coal-mine) Proprietor (dairy station), 1 year	Yes	$15 week	A living	Accident at occupation
2,474	43	17	Laborer (planing-mill)	Laborer (planing-mill) Proprietor (milk station), 2 months	Yes	$3.40 week	40c. day	Accident at occupation
2,199	39	25	Punch-press operator	Proprietor (saloon), 13 years	No	Not stated	Not stated	Accident at occupation
2,846	57	56	Foreman (carding-room)	Repairman (textile machine)	No	$18 week	$3.75 day	Accident at occupation
1,873	28	16	Laborer (sausage factory)	Salesman and bookkeeper (sausage factory), 10 years	Yes	Not stated	$8 week	Accident at occupation
2,875	48	31	Brakeman (railroad)	Crane operator Night watchman Shipping clerk	No	Not stated	$2.10 day	Accident at occupation
1,302	25	14	Boy's work for blast furnace	Sorter (bag factory), 6 years	No	Not stated	$1.81 day	Accident
2,797	38	15	Not stated	Street musician (hand organ), 14 years	No	Not stated	$10 week	Accident
3,413	52	46	Laborer	Street-trade (shoe-string peddler), 6 years	No	$1.50 day	50c. day	Accident

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
2,801	36	14	Furniture factory	Superintendent (furniture factory), 25 years	Yes	Not stated	$25 week	Accident at occupation
2,928	46	17	Not stated	Telephone operator (railroad block telephone), 5 years	No	Not stated	$60 month	Accident
2,983	46	25	Brakeman (railroad)	Watchman (city employee), 4 months	No	$70 month	Not stated	Accident at occupation
3,056	45	24	Not stated	Weigher (steel and wire factory), 20 years	No	Not stated	$2.90 day	Accident at occupation

Occupation of Males from Fifteen to Sixty Years of Age, Crippled by Loss of Right Arm Below Elbow

1,165	24	15	Machine shop	Clerk (record) for engineering firm, 11 months	No	Not stated	$14.40 week	Accident at occupation
2,231	46	22	Not stated	Express proprietor, 4 yrs. Drives team himself	No	Not stated	Not stated	Accident
2,483	40	37	Wheelman (boats)	Laborer (city employee), 2 months	No	$50 month	$12 week	Accident at occupation
1,140	24	23	Hammer-man	Laborer (iron foundry), 3 months	Yes	$3–$3.50 day	$2 day	Accident at occupation
1,694	31	21	'Mud-tender' (brickyard)	1. Painter (oil barrels) 2. Meter reader (valve and nut factory, 2 weeks)	No	Not stated	$2.50 day	Accident at occupation

2,196	49	24	Brakeman (railroad)	Proprietor, moving picture theater, 20 years	No	$60 month	Not stated	Accident
1,771	31	18	Mechanical engineer	News agent, 3 years	No	$4 day	Commission basis	Accident at occupation
2,779	42	14	Not employed	1. Painter 2. Bookkeeper 3. Painter, 6 months	No	None	$3.60 day	Accident, railroad
3,644	54	47	Foreman (furniture factory)	Sander (furniture factory), 16 years	Yes	$18 week	$2.50 day	Accident at occupation
2,252	38	28	Brakeman	1. Night watchman 2. Proprietor, small store, 4 years	No	32c. hour	$75–$100 month	Accident
2,876	47	32	Brakeman	Switchman (railroad), electrical signals, 9 years	Yes	$2.16 day	$74 month	Accident
3,461	40	18	Not employed	1. Collector 2. Proprietor, small store	No	None	Not stated	Accident, hunting
2,970	54	46	Laborer, woolen factory	Street trade, notions, 5 years	No	$1.75 day	Not stated	Accident at occupation
1,709	27	15	Errand-boy	Signal-timer (telegraph company), 4 years	No	Not stated	$12 week	Accident

Occupation of Males from Fifteen to Sixty Years of Age, Crippled by Loss of Right Arm Above the Elbow

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Wages
			Before	Since	
2,892	37	7	None	Bookkeeper, 14 years	$70 month
1,710	26	21	Laborer (laundry), $2 day	Elevator operator, 2 years, 8 months	$1.45 day
590	25	15	None	Elevator operator	$10 week
2,213	55	41	Fireman, 40c. hour	Fireman, 14 years	40c. hour
2,670	50	26	Railroad employee	1. Timekeeper 2. Foreman (railroad), 11 years	$1,800 year
3,549	51	4	Employee (barrel factory)	1. Newspaper route 2. Messenger boy 3. Elevator man 4. Watchman 5. Storekeeper 6. Locksmith, 9 years	$15 week
637	24	23	Not stated	Insurance agent	$3–$5 week
2,732	45	9	None	1. Telegrapher 2. Janitor, 5 years	$30–$40 month
2,172	56	53	Drill operator	Laborer (hydraulic press), 4 months	$2 day
1,602	26	26	Repairing freight cars, $20 week	Laborer (iron foundry), 15 days	25c. hour
3,651	37	13	None	Laborer (sash and door factory), 4 years	$12.50 week
1,645	33	27	Salesman and demonstrator (vacuum cleaner factory), $60 week	1. Salesman 2. Elevator man 3. Choreman 4. Partner, electrical business 5. Telegraph messenger	$60 month

2,765	37	25	Brakeman	1. Station agent, 5 years 2. Proprietor paperhanger, 6 years	Not stated
1,706	33	24	Pressman (printing), $32 week	Peddler of novelties	Not stated
1,917	28	21	Railroad employee, $18 week	1. Switchman, 11 months 2. Presser (tailor-shop), 4 years	Irregular
2,894	58	42	Laborer (blanket mills), $1.05 day	Rag-picker, 15 years	$1.30 day
3,051	47	11	None	1. Foreman U. S. Steel Co. 2. Salesman, monuments 3. Real Estate Agent, 1 year	Not stated
2,926	44	21	Not stated	Salesman, sewing machines, 18 years	Not stated
1,702	30	19	Brakeman (railroad), 2 weeks, $25 month	Sewer Inspector, City, 2 years	$100 month
2,051	30	20	Stationary Engineer, 8 years, $15 week	Stationary Engineer, 2 years	$20 week
2,821	55	25	Railroad employee	Storekeeper, furnace company, 10 years	$2.50 day
2,540	46	27	Switchman (railroad)	Switchman (railroad), 19 years	$62.50 month and shanty
2,925	49	23	Switchman (railroad)	Switch-tender (railroad), 26 years	$12 week
2,721	37	25	Sawyer (lumber-mill) $4 day,	Street trade (paring-knives)	Not stated
2,576	41	38	Civil Engineer	Supt. coke plant, 3 months	Not stated
2,577	42	28	Machinist	Supt. tool-room, 8 years	Not stated
3,577	40	17	None	Telegrapher, 22 years	$75 month
2,976	39	28	Brakeman, 35c. hour	Train dispatcher	Not stated
2,466	44	21	Baker	Watchman, 20 years	$15 week
2,671	53	37	Brakeman	Watchman, 15 years	Not stated
2,169	48	33	Conductor (railroad), $100 month	Weigh-master, 5 years	$80 month

Occupation of Males from Fifteen to Sixty Years of Age, Crippled by Loss of Left Hand

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
1,291	20	18	Machine hand, 9 days	Machine-hand in iron foundry, 3 weeks	Yes	Learning	$10 week	Accident at occupation (Out of work 15 months because of accident)
1,758	26	24	Teamster, 1½ years	Elevator operator, 8 months	No	$15 week	$12 week	Accident
1,663	27	15	Machine hand, 2 years	Driver on delivery team, 10 years	Yes	Not stated	$12 week	Accident at occupation
1,661	30	16	Laborer in stone quarry, 2 years	Laborer in cement factory, 5 months	No	$2.25 day	$2.50–$2.75 day	Accident at occupation
1,757	33	29	Painter, 1 year	Foreman for contractor, 5 months	No	Not stated	40c. hour	Accident (4th of July celebration)
1,834	34	25	Operated grinding machine	Salesman for oil company	No	$1.50 day	$12–$15 week	Accident at occupation
1,625	35	30	Handy-man, 10 years	Same	Yes	$50 month	$50 month	Accident at occupation
2,245	46	27	Molder	Watchman	No	Not stated	Not stated	Accident at occupation
2,468	38	35	Contractor, self	Same	Self	Not stated	Not stated	Accident at occupation

2,973	50	25	Farmer, self	Bartender, 3 months	Self	Not stated	$15 week	Accident at occupation
2,261	51	32	Puddler in rubber factory	Furnace recorder, 5 years	No	$1.65 day	$12.50 week	Accident at occupation
3,656	52	34	Bricklayer, 10 years	Installment agent	No	45c. hour	Commission amount not stated	Accident, fire-crackers
2,502	54	27	Carpenter, 8 months	Pressman, 22 years	Yes	$2.25 day	$2.75 day	Accident at occupation
2,854	57	33	1. Laborer, brickyard 2. Presser in tailor-shop	Presser	No	$13 week	$13 week	Accident, explosion of gun

Occupation of Males from Fifteen to Sixty Years of Age, Crippled by Loss of Left Arm Below the Elbow

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
1,701	29	22	Not stated	1. Salesman 2. Saloonkeeper 3. Inspector of streets	Not stated	Not stated	$12–$15 week	Accident at occupation
2,122	34	13		Driver			$12 week	Accident
3,068	34	10		1. Stenographer and bookkeeper, 6 years 2. Cost accountant, 10 years			$100 month	Accident

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
1,893	34	23	Wood-cutter, 1 year	Watchman, 10 years	Yes	$2.50 day	$12 week	Accident at occupation
3,091	36	31	Not stated	Bill collector	Yes	Not stated	$2.65 day	Accident at occupation
3,584	40	7		Time keeper			Not stated	Accident
2,240	40	16	Not stated	Telegraph operator	Not stated	Not stated	$75 month	Accident
3,715	43	16	Not stated	Licensed fireman, 4 years	Not stated	Not stated	Not stated	Accident at occupation
2,919	48	45	Ironworker-foreman, 25 years	1. Ironworker-foreman 2. Storekeeper, 1 year	Yes	$6 day	$6 day	Accident at occupation

Occupation of Males from Fifteen to Sixty Years of Age, Crippled by Loss of Left Arm Above the Elbow

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
705	20	14		Night telephone operator, 4 years			$10 week	Accident
1,442	24	9		Notary public and real estate, 2 years			$100 month	Accident, wire-making machine

1,431	24	9		1. Clerk, 9 years 2. Timekeeper, 3 months			$55 month $90 month	Accident railroad
720	25	6		Insurance agent			Not stated	Accident
1,714	27	25	Was not working	1. Subscription canvasser, 1½ years 2. Bill collector, 6 months			Not stated	Accident
1,667	28	19	Was not working; learning to be telegraph operator, thought he could not continue	Traveling salesman			$25 week and commission	Accident railroad
1,885	29	18	Not stated	1. Manufacturer of dust-cloths (proprietor), 8 years 2. Salesman, 2 years		Not stated	Commission, amount not stated	Accident at occupation
1,791	30	18	Iron-handle-maker, 2 years	Hard-wood finisher, 5 years	No	$1 day	$2.50 day	Accident at occupation (Took business course, never made use of it)
1,876	32	26	Switchman (railroad), 4 years	Grocery storekeeper, 4 months	No, brought suit against company	$15 week	$12–$15 week	Accident at occupation
1,929	32	23	Laborer	Teamster (3 years)	No	Not stated	Board and clothes	Accident (Man shot him. Expects to get job in saloon)

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
1,806	33	27	Laborer in stockyards, 5 months	Watchman	No	20c. hour	$50 month	Accident at occupation
1,745	33	29	Not stated	Switchman	Yes, life job	Not stated	$62 month	Accident at occupation
2,055	33	27	Molder, 5 years	1. Watchman, 4 months 2. Peddler, fruit and vegetables, 1 year	No	$3.50–$4 day	$20 in summer only	Accident railroad (walking on tracks)
2,597	37	31	Proprietor	Furnace factory, always	Self	Not stated	Not stated	Accident
2,863	37	9		1. Janitor, 9 months 2. Garbage collector			1. $40 month with rent free 2. $2.75 day	Accident
2,715	38	25	Machinist, 3 years	Small store-keeper	No	Not stated	Not stated	Accident railroad
2,257	38	30	Timekeeper, 6 years	Captain or guard on bridge, 1 year	No	$70 month	$60 month	Accident at occupation
2,747	38	29	Assistant conductor, 7 years	1. Brakeman 2. Switchman, 8 years	Yes	$100 month	$67.50 month	Accident at occupation
2,290	39	12		1. Driver, 4 years 2. Bill collector, 4 years			1. $12 week 2. $16 week	Accident railroad

3,472	39	32	Roofer, 16 years	1. Gate operator (railroad), 9 months 2. Water meter reader, 2 years	No	30c. hour	1. $37 month 2. $2 day	Accident railroad (Man getting lazy and into bad habits since accident)
2,282	41	21	Not stated	1. Elevator operator 2. Painter	Yes	Not stated	1. Not stated 2. 30c. hour	Accident railroad
2,960	41	16	Brakeman on railroad earning college tuition	1. Teacher of stenography 2. Stenographer and bookkeeper 3. Canvasser of books 4. Painter, 2 years	Did not wish to return	$12 week	Not stated	Accident at occupation
2,254	41	31	Not stated	Watchman, railroad	Yes	Not stated	18c. hour	Accident
2,882	42	18	Not stated	1. Tinner, 4 years 2. Laborer, 17 years	No		1. $2 day 2. $65 month	Accident
3,664	43	3		1. Choreman 2. Elevator operator			1. Not stated 2. $9.45 week	Accident
2,187	43	12		1. Telegraph operator (railroad), 2 years 2. Supervisor, Western Union, 12 years			1. $65 month 2. $110 month	Accident
2,729	43	20	Molder	1. Canvassing 2. Janitor, 3 years	No	Not stated	1. Not stated 2. $12 week	Accident
2,209	47	27	Machine operator	Sorter in blanket factory, 20 years	No	$10 week	Not stated	Accident at occupation

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
2,944	48	40	Painter	Same, always	Yes	$2–$3 day	Same	Accident
3,680	50	44	Not stated	1. Laborer 2. Watchman, 2 yrs.	Not stated	Not stated	1. $1.75 day 2. $41 month	Accident at occupation
2,776	51	33	Yard conductor (railroad), 4 yrs.	Yardmaster (railroad), 18 years	Yes	$85 month	$120 month	Accident at occupation
2,734	52	43	Conductor (railroad), 23 years	Yardman, 9 years	Yes	$100 month	$120 month	Accident at occupation (Company gave him life job)
2,655	52	40	Steeplejack, 20 years	Same	Yes	By contract	Same	Accident
2,921	53	24	Steam-fitter	1. Marine engineer, 15 years 2. Machinist 3. Automobile repairing for self, 2 yrs.	No	[7] Learning trade	1. $175 month 3. $20–$25 week	Accident at occupation
2,639	58	43	Switchman, 10 years	1. Targetman 2. Watchman, 2 mos.	Yes, but with so little pay, man could not stay. Offered life job	$65–$70 month	1. $30 month 2. $60 month	

[7] Man re-educated self after accident, used money for education, took course at Case School, then Franklin Institute, Penn. Learned to be Marine Engineer.

Occupation of Males from Fifteen to Sixty Years of Age with Defect of Both Legs

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Cause of Disability	Appliance Used	Occupation before Disability	Wage	Occupation since Disability	Wage	Remarks
2,126	18	14	Accident	None			1. Sorted papers in waste paper Company, 2 weeks 2. Errand-boy	$1.50–$2 week	Boy appears to be 'feeble-minded'
1,303	20	8	Disease (Blood-poisoning)	None			Tailor-baster	$8–$10 week	Father and brother little interested, judge he is not at home much of time. Lazy
1,178	20	1	Disease	None			Shipping clerk	$8 week	Very ambitious
1,267	22	12	Disease	None			Learning to be toolmaker. Starts machine, then sits down	$10–$15 week	
1,289	23	9 mos.	Disease	1 crutch			Elevator operator, 1 week	Under $10 week	"Thought to be lazy"
1,145	23	5 mos.	Infantile paralysis	2 crutches			Shoe-shining stand, 7 years	Under $10 week	Not able to support himself
1,371	23	18 mos.	Accident	2 crutches			Proprietor of store, 7 years		No strength in limbs
1,219	24	Birth	Congenital abnormality	None			Ornamental draftsman, 2 years	$25 week	Much treatment without improvement

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Cause of Disability	Appliance Used	Occupation before Disability	Wage	Occupation since Disability	Wage	Remarks
2,005	27	8	Disease	None			1. Peddler of candy and popcorn in wagon, 1 year 2. Peddled chewing gum, 10 years	$30 mo.	
1,703	28	2	Not stated	None			1. Proprietor of small plastering business 2. Accountant 3. Billing clerk	$15–$20 week	Changed position many times without reason. Feels superior to common work. Spoiled as child by parents
2,117	31	12	Accident	1 crutch			Ticket agent (railroad), 7 years		
2,033	32	27	Disease	1 cane			Tailor, 10 years	$15-$20 week	
1,712	32	15	Disease	2 crutches			Elevator operator, 4 years	$10-$15 week	"Has kidney trouble"
1,752	35	32	Disease	None			Janitor and assists wife in candy store, 1 year	Under $10 wk.	
2,153	37	2	Infantile paralysis	Brace			1. Iron and steel laborer, 3 years 2. Machinist, auto repairer, 3 years	$10-$15 week $20-$25 week	"Very sensitive"

2,956	38	13	Accident at occupation	None			Telephone Co., 8 years	Not stated	Physical condition no handicap in present work
2,789	39	2	Accident	None			Sells papers	Under $10 wk.	
2,563	42	40	Disease	None			Bolt machine operator	$15-$20 week	
3,653	44	5	Disease	2 crutches			1. Proprietor small store 2. Tailor	$10-$15 week	
2,562	45	31	Disease	1 cane	Office work		Notary public		Intelligent, well-educated
2,891	46	44	Disease	1 cane	Molder, 6 years	$4 day	Odd jobs at iron works, 1 year	$10-$15 week	
2,654	47	Birth	Congenital abnormality	1 cane	Lineman Telephone Company	Not stated	Elevator operator, 8 months	Under $10 wk.	Otherwise in good health
2,665	48	15	Disease	Wheel-chair			Proprietor small store		Arms almost helpless
2,860	49	39	Disease	2 crutches	Truck driver, 5 years	$12 wk.	Unskilled laborer, (makes pail handles) 10 years	$10-$15 week	
3,748	50	35	Disease	2 crutches	Not stated		Cigar-maker, 2 yrs.	$10-$15 week	Wheel-chair part of time
2,206	51	Birth	Congenital abnormality	Special shoes			Tailor, 35 years		Industrious
3,760	52	45	Disease	2 canes	Not stated	$2,500 year	Loan broker, 5 yrs.		Condition prevents successful business

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Cause of Disability	Appliance Used	Occupation before Disability	Wage	Occupation since Disability	Wage	Remarks
2,664	53	23	Disease	2 crutches	Not stated		Proprietor floral business, 15 years		
3,086	55	41	Accident	None	Gardening, 2 yrs.	$20 mo. and bd.	Teamster, 6 weeks	$15-$20 week	
2,992	57	50	Disease	1 cane		Good	'Handy-man'	$10-$15 week	
3,563	57	51	Disease	None	Carpenter in factory	$2.75 day	Carpenter, small jobs, 3 years	$20-$25 week	
3,757	57	47	Disease	1 crutch	1. Heavy labor in blast furnace 2. Delivering sewing machines		Repairs sewing-machines, 10 years		

Occupation of Males from Fifteen to Sixty Years of Age, Crippled by Deformity of Body

Case No.	Age[a]	Occupation	No. Years Employed	Wages
2,486	45	Bookkeeper	6–7 years	$65 month
1,252	24	Driver for dairy company	Not stated	$70 month
1,198	24	Delivery man for fruit dealer Farming	2 months 4–5 years	$6 week Not stated
1,894	35	Draftsman (iron foundry and machine shop products)	6 years	$30 week
2,897	36	Elevator operator	5 years	$60 month

1,606	31	Grinding machine operator (machine shop products)	Not stated	$2.50 day
574	23	Helper in box factory	6 years	$1.50 day
2,850	44	Helper in bedstead factory	19 years	$2 day
1,600	28	Insurance clerk	5 years	$7 week
2,900	47	Laborer (city employee)	Many years	$2 day
3,679	42	Laborer for florist (mother)	Not stated	$12 week
1,222	22	Machine operator (sweater factory) Light farm work	2 months 6 years	$9.50 week Not stated
1,609	31	Manager of bakery for mother	Not stated	No regular wages
1,275	23	Office boy for charitable agency	2 months	$30 month
1,884	28	Proprietor of pool room	Not stated	$15 week
2,748	36	Proprietor of drug store	Not stated	Not stated
1,142	21	Punch press operator in gasoline engine factory	4 years	$15 week
2,982	36	Record clerk (railroad)	3 years	$18 week
1,644	29	Roller in cigar factory	5 years	$12–$13 week
2,274	42	Stitcher in clothing factory	23 years	$18 week
3,107	45	Stitcher in clothing factory Skirtmaker in clothing factory	1 week 10 years	$9 week $16–$17 week
1,253	21	Stock-room hand	7 weeks	$9 week
2,140	26	Salesman (cigars)	4 years	$15 week and commission
1,259	25	Street trade (newspaper route)	4 years	$3.75 week
3,357	46	Tailor (self)	15 years	$15 week
1,664	32	Upholsterer (self)	15 years	Not stated

[a] Age at time of Survey—Age at Occurrence of Disability in this group is usually congenital or early childhood.

Occupation of Males from Fifteen to Sixty Years of Age, Crippled by Disability of Arms or Legs, or of Both and of Body

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Employer Before and Since	Wages		Cause of Disability	Remarks
			Before	Since		Before	Since		
712	16	13		Clerk in small grocery-store, 2 years	Works for father		No definite amount	Disease	
1,839	18	Under 5		Clerical work in office, 5 weeks	Automobile factory		$30 month	Disease	
1,525	18	Under 5		Street trade, newsstand, 2 years	Self		$3–$5 week	Disease	
1,358	21	Under 5		Machine operator clothing factory			$9 week	Disease	Finds lameness no handicap
1,187	21	Under 5		1. Horseshoer, 2 yrs. 2. Machine tender, 3 months			$2–$3.50 week	Accident	
1,334	22	Birth		Baster tailor, 4 yrs.			$10 week	Congenital	
1,271	23	Under 5		Helper in sewing machine factory, 1½ years			$2 day	Disease	
1.215	23	9		1. Machine operator. Found work too hard 2. Errand boy, 8 years (nut and bolt factory)			$1.25 day	Disease	Industrious and ambitious

592	25	10		Delivery man, 1 year	Employed by cousin		$10 week	Accident	
1,904	28	24		1. Screw machine hand, 15 months 2. Screw machine operator, 1 year			25c. hour	Disease	Cripple hopes to learn trade; is unhappy because he cannot compete with other men. Spoiled by mother
1,813	28	7		1. Stenographer, 2 years 2 Repairer of bicycles and locks, 2 months			$1.50–$2 day	Disease	Finds it easier to do active than sedentary work. Uses two crutches
1,730	28	5		1. Newspaper route, 13 years 2. Laborer in city park, 3 months			$10 week	Disease	Badly crippled; Cheerful and bright. Ambitious to work. Statute enforced preventing his selling newspapers on street, at which he could earn good living
1,810	28	Birth		Street trade, newspaper, 9 years			$3.50 week	Congenital	Graduated from high school. Seriously crippled. Uses tricycle. Bright mentally but can hardly talk. Uses two hands to write
1,972	29	20	Driver (mail wagon), 4 years	Elevator operator, 4 years. Returned to former job for short time	Yes, for short time; not now	Not stated	Not stated	Accident	
1,652	29	18	Worked for father (motor-boat supply company), 9 years	Same	Father, yes	$30–$35 week	Same	Accident	

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Employer Before and Since	Wage		Cause of Disability	Remarks
			Before	Since		Before	Since		
1,608	30	10		Street trade, newspaper, 15 years			$3-$4 week	Disease	
1,930	32	29	Machinist, 8–9 years	Painter, 3 months	No	$4 day	$10 week	Not stated	Cripple finds present occupation trying; wants light work where he could sit most of time
2,105	33	33	Stationary engineer, 10 years	Canvasser, 6 weeks	No	$15 week	$15 week	Disease	
1,749	34	20		Fire insurance agent	Self		Not stated	Disease	Is confined to bed but transacts his business
3,671	35	Birth		Street trade, newspaper			$12–$18 week	Congenital	
3,416	36	20	Cigarmaker	1. Cigarmaker 2. Janitor	For a time	$16 week	$16 week $15 week	Accident	
2,306	36	Under 5		1. Shoe-repairer 2. Carpenter work 3. Auto-repairing	Self Self Self		Small amounts $1–$5 day	Disease	
3,580	39	20		1. Elevator man 2. Custodian	Yes	$12 week	$12 week	Accident at occupation	
3,647	40	5		1. Drill press operator, 2 years 2. Lathe hand, 1½ years	Yes	$12 week	20c. hour $2.75 day	Accident	
3,450	40	Not stated		Physician				Disease	

2,718	43	27	Miner, 10–12 years	Laborer, 3–4 years	Yes	$3–$4 day	$2 day	Disease	'Bends' contracted at work
3,514	43	33	Wood finisher	Woodfinisher	Yes	Not stated	Not stated	Accident	
2,508	45	18	Teamster	Auto painter	No	Not stated	$4–6 day	Accident	
3,667	45	33	Drafting	Drafting	No	$4 day	Not stated	Disease	
3,099	46	33		Coatmaker	Yes	50c. coat	Same	Disease	
2,710	47	31	Air-valve maker, 10 years	Elevator operator, 1 year	No	$3.50 day	$1.25 day	Accident at occupation	
2,221	47	41	Paperhanger and contractor, self	Small storekeeper	Self	Not stated	Not stated	Accident at occupation	
2,218	49	32	Mining and prospecting	Photographer for factory	No	Not stated	Not stated	Accident	Wheel-chair case. Does work at home. Taught himself photography. Started out working for amateurs, but does largely commercial work
2,315	50	49	Carpenter	Carpenter	Always worked for many	$2.50 day	$3–4 day	Accident	
2,852	51	15		Paperhanger, 20 yrs.			$1.50 day	Disease	
3,453	51	35	Deliveryman, 3 years	Street operating	No	$9 wk.	$2 week	Accident at occupation	Alcoholic

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Employer Before and Since	Wages		Cause of Disability	Remarks
			Before	Since		Before	Since		
3,678	51	20	Not stated	Watchman	Not stated		$60 month	Accident	
3,499	51	Under 5		1. Express team, 20 years 2. Street operating			Not stated	Not stated	
3,752	52	45	Engineer, 7 yrs.	Tester, 7 months	Yes	27c. hr.	22½c. hr.	Not stated	
2,684	52	46	Foreman, 13 years	Small storekeeper	No	$45–$65 month	Not stated	Accident	
2,579	53	38	Superintendent, paint factory, 18 years	Small storekeeper, 12 years	No	$100 month	Meets expenses	Disease	
2,837	54	50	Teamster, 4 yrs.	Teamster, 9 mos.	No	$18 week	$15 week	Accident	
2,939	54	39	Butcher, 25 yrs.	Same	Self	Not stated	Not stated	Disease	
2,870	55	25	Brakeman (railroad)	Call clerk	Yes	$60 month	$45 month	Accident at occupation	
2,333	58	53	Carpenter	Same	No	$2.50 day	Not stated	Accident at occupation	
2,167	58	41	Foreman	Coal agent	No	Not stated	$8–$10 week	Disease	

Occupation of Females from Fifteen to Sixty Years of Age, Crippled by Loss of Right Hand

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
1,963	30	25	Laundress	Laundress and housewife	Yes	$5 week	$5 week	Accident at occupation
2,070	35	Birth		Always housewife, does all her housework, washes, irons, etc.; has 5 children to take care of			Not stated	Congenital
2,328	46	13	None—	1. Operated mangler in laundry 2. Housewife—does all her own work	Worked for one employer for 7 yrs.		$6.25 wk.	Accident

Occupation of Females from Fifteen to Sixty Years of Age, Crippled by Loss of Right Arm Above Elbow

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
3,511	40	2		Always housewife, before and after marriage; does all her own work	At home	None	None	Accident
2,032	35	3		1. Nursemaid 2. Housewife—does all her own work			Not stated	Accident railroad

Occupation of Females from Fifteen to Sixty Years of Age, Crippled by Loss of Left Hand

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
2,074	35	19	Mangler, 6 months	Did not return to work. Was offered other job in same company. Housewife—at home	No	$6.50 week	No wages	Accident at occupation

Occupation of Females from Fifteen to Sixty Years of Age, Crippled by Loss of Left Arm Below Elbow

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
2,447	40	Birth		1. Teacher, 5 years 2. Housewife			$60 mo. None	Congenital
2,694	59	42	Dressmaker at home, 10 years	Housework—does all work		Irregular	None	Disease

Occupation of Females from Fifteen to Sixty Years of Age, Crippled by Defect of Left Hand

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Occupation		Same Employer Before and Since	Wages		Cause of Disability
			Before	Since		Before	Since	
1,547	21	Birth		Clerical work, 5 years	Same		$8 week	Congenital, 2 fingers lacking
1,926	30	16	Machine operator	Forewoman, 3 months	Same	$4 week	$10–$15 week	Accident at occupation; 2 fingers gone on left hand
				Defect of Right Hand				
2,106	30	13		1. Dressmaker, 5 years 2. Cleaning woman	No		$1.60 day	Accident, 2 fingers gone
1,857	34	33	Housemaid	Same	No	$2 week and board	Same	Accident, 4 fingers useless
2,151	36	29	Punch press operator	Helper in woolen mills, 5 years	No	$6 week	$5–$6 week	Accident at occupation
				Defect of Left Arm				
1,261	16	Under 5 years		Servant, 1 year			$3 week	Accident, stiff arm, cannot raise it

Occupation of Females from Fifteen to Sixty Years of Age, with Defect of Both Legs

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Cause of Disability	Appliances Used	Occupation Since Disability	Wage
1,293	20	Birth	Congenital	None—lame	Book-keeping and stenography in overall factory, 2 months	$7 week
2,262	39	Birth	Congenital	None—lame	Cashier (city bath house)	$45 month
3,065	40	25	Accident	None—lame	Chambermaid in hotel (previously did laundry work)	$4 week
1,622	35	3	Disease	Wheel-chair	Dressmaking at home	$6 week
3,590	41	16 mos.	Disease	Crutch, indoors; tricycle, outdoors	Hand embroiderer	$12 month
1,258	19	3	Disease	Caliper braces and crutches	Hand sewing for special workshop	35c. day
1,158	23	9 mos.	Disease	Crutch and cane	Dressmaking in shop, 2 months	$9 week
3,564	54	6	Disease	Extension shoe	Lodging-house keeper	"Meets expenses"
2,402	45	1	Accident	None—lame	Lodging-house keeper, dressmaking before marriage	Not stated
2,507	58	48	Disease	None—lame	Lodging-house keeper	"Meets expenses"
2,645	54	54	Accident	2 crutches	Lodging-house keeper	Not stated
2,286	44	2	Disease	2 crutches	Music teacher, 10 years	Not stated
1,880	26	Birth	Congenital	None—lame	Music teacher, 6 years	$9.30 week
2,014	26	3	Disease	2 crutches, indoors; tricycle, outdoors	Music teacher, 8 years	$20–$25 week
3,463	50	21	Disease	None—lame	Housewife	
3,729	37	Birth	Congenital	Extension shoe	Housewife	
2,326	40	30	Disease	None—lame	Housewife	

3,440	58	Birth	Congenital	None—lame	Before marriage worked in packing factory	
3,688	55	53	Not stated	None—lame	Housewife	
3,507	50	8	Disease	None—lame	Housewife	
2,548	50	38	Disease	Cane	Housewife	
3,607	43	33	Disease	None—lame	Housewife	
2,320	46	41	Disease	Cane	Housewife	
725	23	Birth	Congenital	None—lame	Housewife	

Occupation of Females from Fifteen to Sixty Years of Age, Crippled by Deformity of Body

Case No.	Age	Age at Occurrence of Disability	Occupation	Number of Years Employed	Wages
1,759	27	Under 5	Cashier in restaurant	Not stated	$8 week
3,705	54	10	Charwoman	Not stated	$1.60 day
1,332	22	18	Clerk in department store and ticket-seller in theater	4½ years	$5 week
1,216	16	12	Clerk in store, also music-teacher (has few pupils)	1 year	$6 week
1,879	29	2	Chief operator, telephone exchange	6 years	$50 month
698	20	2	Crocheting at home	Not stated	$2 week
1,531	18	5	Cutter in clothing factory	1 year	$5 week
1,195	18	5	Folder in sweater factory	1 year	$5 week
1,626	30	12	Hand sewing in special workshop	2 years	80c. day
701	17	15	Hand sewing in special workshop	2 months	$2–$3 week
1,882	31	2	Housewife		
3,421	48	12	Housewife		
2,375	50	13	Housewife		
2,011	33	14	Housewife		
2,101	32	7	Housewife		

Case No.	Age	Age at Occurrence of Disability	Occupation	Number of Years Employed	Wages
1,554	24	Under 5	Housewife		
660	19	4	Housewife		
1,977	30	Birth	Housewife		
3,543	40	3	Housewife		
2,104	30	2	Housewife		
2,110	32	2	Housewife		
3,661	55	43	Housewife		
3,432	50	44	Housewife		
1,312	25	12	Housewife		
2,336	47	Under 5	Housewife		
1,230	22	10	Helper in bag factory Tally girl in woolen factory	3 months 1 year	$6 week $5 week
1,787	27	2	Machine operator in garment factory	1½ year	$6–$8 week
2,113	30	20	Machine operator in garment factory	1 year	$10 week
1,784	32	Birth	Machine operator in garment factory	1 year	$4.50 week (piece-work)
4,484	35	4	Mender in sweater factory	12 years	$9–$10 week
569	20	12	Packer in macaroni factory	4 years	$9.56 week
1,435	17	11	Servant	3 years	Not stated
2,988	48	Under 5	Sorter of rags in junk-shop	Not stated	$7.50 week
1,236	17	2	Stenographer	2 weeks	$50 month
591	23	3	Wrapper and labeller, candy factory	6 years	$6 week
1,954	35	3	Stitcher, clothing factory	10–12 years	$5–$7 week
1,152	19	14	Stockroom and order girl	1 year	$8 week
1,852	30	Birth	Tailor	16 years	$12 week
1,655	29	Birth	Telephone operator	2 years	$10 week

Males from Fifteen to Sixty Years of Age, at Work in Same Occupation Five Years or More Since Crippled, and Who Are Crippled by Loss or Defect of One or Both Arms and One or Both Legs

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Cause of Disability	Appliances Used	Occupation Before Disability	Wage	Occupation Since Disability	Wage	Remarks
2,793	41	19	Accident	Artificial limb	Learning to be machinist	Not stated	Bookkeeper, 8 years	$18–$20 week	Completed high school course after accident. Then took business course
2,754	57	Under 5	Disease	None, lame			Caretaker in cemetery, 10 years	Not stated	
2,532	54	41	Disease	Crutch and special shoe	Chair-weaver, 8 years	$3 week	Carpet-weaver, 3 years	Not stated	
2,510	46	26	Accident	Artificial limb	Conductor on railroad	Not stated	Clerk (Benefit Insurance Company), 17 yrs.	Not stated	Had 1 year in business college after 3 years in high school
3,349	59	54	Accident	None, lame	Same		Commission broker	Not stated	
2,482	37	Under 5	Disease	Uses tricycle			Peddler, candy, 20 yrs.	$5–$6 week	"Question of mentality." Seemed childish
2,305	47	32	Accident	Cane	Meat cook in restaurant, 10 years	$12 week	Peddler, shoe-strings, 5 years	$2–$5 week	
2,681	55	20	Disease	Artificial limb	Janitor, 4 years	$40 month	Proprietor of restaurant, does cooking himself	Not stated	

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Cause of Disability	Appliances Used	Occupation Before Disability	Wage	Occupation Since Disability	Wage	Remarks
2,844	47	37	Disease	None, lame			Proprietor, wholesale grain business	Not stated	
3,097	42	30	Disease	None, lame	Sausage-maker, 4 ys.	$18 wk.	Sausage-maker, 1 year	$12.40 week	Out of work 2 years because of handicap; returned to same kind of work with new employer
2,241	40	2 wks.	Disease	Special shoe			1. Bottled beer, 6 years 2. Stock-keeper in bolt and nut factory, 4 yrs. (now)	$12 week	
1,821	26	13	Disease	Brace and crutch			Sub-foreman for manufacturing chemists for 5 years	Not stated	
1,833	32	Birth	Congenital	None, lame			Teamster, 12 years	$3 day	
3,061	53	43	Accident	None	Laborer in blast furnace	$1.73 day	Watchman, 9 years Same employer	$1.73 day	Was promised a life job at time of injury

Study of Males from Fifteen to Sixty Years of Age, Crippled by Loss of Right Arm Above Elbow, Who Are Not at Work[9]

Case No.	Age at Time of Survey	Age at Occurrence of Disability	Cause of Disability	Artificial Arm	Occupation Before Disability	More than One Handicap	Mental Condition	Personal Attitude and Habits	Reasons for Unemployment Length of Time
1,940	26	25	Accident	No	Painter of rails for railroad (stationary fireman, unskilled)	No	Normal	Ambitious	Still under treatment, expects to return to former employer, but not to same job. Has been promised job in storeroom at former wages; cannot speak English

1,680	29	21	Accident	No	Laborer in factory	No	Normal	Lacks push and seems unhappy	Thinks he cannot get job because of handicap and because he cannot speak English. Latter is chief reason for being out of work three years. Does housework for uncle's family because of aunt's illness, apparently convenient arrangement for family
2,411	37	37	Accident	Not stated	Foreman and estimator of carpentry, 12 years	No	Normal	Ambitious	Accident month ago, too recent to state man's ability to return to work, is hoping to return to same type of work with probably less pay
2,419	37	29	Accident	Not stated	Foreman in stockroom, National Lamp Co., 4 years. Inspector of City sidewalks 2 years. Drop-forge man 2 years	No	Normal	Ambitious, has worked hard always	Has not had steady work for two years. Employers won't give him chance because of handicap. Has taught himself to write with left hand
2,335	45	45	Disease	Not stated	Decorator, 25 years	Not stated	Normal	Ambitious	Accident two months ago; is hoping to return to some kind of work, either as watchman or possibly to start in business for himself
3,682	58	23	Accident	No	Cabinet-maker, foreman in planing mill	Bright's Disease	Normal	Ambitious	Man has been out of work many years because of ill health. Had saloon for years after accident though he disliked type of business; seemed only opening. Has learned to write with left hand
2,344	59	51	Accident	Not stated	Teamster	No	Normal	Lazy and alcoholic	No reason given for unemployment

---

* Compare with page 56 showing men of same disability *at work*.

STORIES OF STREET OPERATORS

Survey No. 2799

Male, thirty-seven years, born in Italy, has been in United States nine years. Went to school until thirteen years of age in Italy; schools ungraded. Was employed as laborer on railroad in United States. Repaired railroad tracks. At age of thirty-two, in a dynamite explosion, lost thumb and first two fingers of left hand and became blind. Received no compensation because accident was thought to be his own fault. Since that time has sold papers, sits on bench in Park all day, has band on his hat which reads: "Please help the Blind." Has been unable to find any other kind of job. Has a wife who works on the farms during the summer time, making irregular amounts of money. Man makes about twenty-five cents a day. Known to Charitable Agencies.

Survey No. 3052

Male, forty-four years, born in Austria, has been in United States thirty-six years. Attended Common School, reached the third grade at sixteen years of age. Speaks very little English.[10] At age of nine months had infantile paralysis which affected left arm and hand. Has had no industrial training or experience and has always been a peddler. Sells gum and candy at dances, on street, and on ball grounds. Amount made, not stated. Has wife and no children. Is dependent on wife's relatives. Home miserable, dirty and unsanitary. Question of wife being feeble-minded. Known to Social Agencies.

Survey No. 2482

Male, thirty-seven years, born in United States. Attended grammar school up to seventh grade; did not go to school until eighteen years. No industrial experience. Has been paralyzed in left arm and hand and left leg since a baby. Uses a tricycle out of doors, in the house pushes himself about on casters. Can move his legs to run the tricycle, but cannot stand. Has never done any work except peddling candy. Sits in his tricycle and sells to newsboys. Can do this in summer and in good weather. Makes from $5 to $6 per week. Is dependent upon brothers.

---

[10] Speaks Yiddish. Appeared to visitor intelligent.

Survey No. 2305

Male, single, forty-seven years, born in United States. Went through seventh grade Parochial School, got through at twelve and one-half years. Learned to cook at home, afterward was an apprentice in hotel. Later secured job as meat cook in a restaurant where for eighteen years he earned $12.00 a week. At age of thirty-two, entire left side became paralyzed as result of fall from running board of car which caused dislocation of hip. After accident he was able to return to former occupation, but for five years has been unable to get a job because he cannot get about quickly enough. During this time he has peddled shoe-strings and pins from house to house, earning from $2 to $5 a week. He would like steady work and has tried to get an elevator job through agencies.

Survey No. 3579

Male, fifty-seven years, born in Russia and ten years in United States. Is illiterate and speaks no English. Has had no industrial experience or training. At the age of forty-one, he broke a bone in his right arm and lost one finger on right hand. Had formerly been a laborer in factory, but was unable to return to former job. He sued his former employer and secured $200. From this amount he paid $30 to an interpreter and also paid lawyers. For two years he has not been able to work. Has a wife and two children, so has been forced to sell pencils and shoe-strings for six years, which was the advice of some people. He makes about a dollar a day, and this, in addition to what a son eighteen years old earns, is the entire budget. They live in four clean rooms, rent $7.50 a month.

Survey No. 2720

Male, forty years, born in Ireland. Illiterate. At age of five, had rheumatism in leg and arm which resulted in partial disuse of both. Has had no industrial training; was a salesman for an automobile company for four years and made from $20 to $30 a week. For four years has canvassed notions from house to house, making irregular amounts. Home clean. Has a wife and two children to support. Known to Social Agencies.

Survey No. 2813

Male, forty-five years old, born in Italy, who has been in United States for ten years. Is illiterate and speaks no English. For one year he was employed as a machine hand in railroad car-shop. At the age of thirty-nine, he met with an accident—was shot in left leg by unknown assailant—which necessitated amputation of leg two inches below thigh. He now walks with two crutches. Was unable to return to former occupation. From four to five years he has been selling pencils on street. This man thinks with an artificial limb he could return to former occupation. His one ambition is to earn enough money to go back to Italy, where his motherless children are living. His wife died eighteen months ago. At present he lives in lodging-house, where he pays $3.50 a month for a room. Not known to Social Agencies.

Survey No. 2970

Male, single, fifty-four years, born in Ireland; in United States thirty-four years. Went to public school in Ireland until thirteen years of age. Has been a farmer, locomotive builder, and locomotive engineer. When working three weeks in a woolen mill, met with accident which resulted in amputation of right arm below elbow. Received $200 compensation and hospital expenses. Was unable to return to former occupation and has had difficulty in getting work. Sells notions, needles, pins, etc., from house to house. Amount he makes not stated.

Survey No. 2721

Male, single, thirty-seven years, born in United States. Went to school until eight years of age, no industrial training. Was a sawyer in lumber mill for three years. Earned $4 a day. At the age of twenty-five met with accident (cause not stated) which resulted in amputation of right arm above elbow and three fingers on left hand. Since that time he has been unable to get work and feels that he cannot even get a chance to interview any employers. He sued his employers for accident, got $25,000 in two lower courts, Supreme Court reversed judgment and man got nothing, legal fight cost him $800. Has been out of work twelve years. Since that time has been selling paring knives from house to house. Man would like regular work. Landlady said he was hard working, honest, and does not drink.

Survey No. 3413

Male, fifty-two years, born in United States. Educated in grammar school, fourth grade, left at twelve years. No industrial training. Was a laborer (pick and shovel) for gas company for five years. Met with accident which resulted in blood poisoning. Later, right hand had to be amputated above wrist. He has no artificial hand. Was unable to return to former occupation, and for six years has peddled shoe-strings and collar buttons; makes about fifty cents a day. Is unmarried.

Survey No. 2005

Male, single, twenty-seven years, born in United States. Went three years to school, left at eight years, at which age both legs became paralyzed. As he is unable to walk at all, he creeps indoors. Out-of-doors he uses wheel-chair. Has peddled chewing-gum, candy, and popcorn all his life. Makes about $30 a month. Seems ambitious. Known to Social Agencies.

Survey No. 1721

Male, single, twenty-eight years, born in Italy; in United States for fourteen years. Went to school in Italy, then about a year in United States. Finished fifth grade when sixteen years of age. Speaks English. At fourteen years was run over by train, resulting in amputation of left leg above knee. Has artificial leg. For four years he has sold popcorn. Although he has never looked for any kind of work, he would like to have a regular job and salary. He seems exceedingly ambitious and needs someone to help and advise him.

Survey No. 1724

Male, twenty-nine years, born in Italy; in United States thirteen years. Went to school until seventeen years of age; speaks no English. As result of accident when nineteen years of age, both arms are cut off below elbow. Has no artificial arms. Has been out of work ten years because unable to find any work that he can do. Spends most of his time begging. As he cannot support his wife and two children, his wife is compelled to take in washing.

Survey No. 3376

Male, single, forty-two years, born in United States. Went to school until fourteen years old. At the age of twenty, had some disease which affected right leg, which causes him to walk with difficulty. For two years he was a cigar-maker. Because of his extremely nervous condition he has been unable to get work. Peddles notions. He lives at home with his mother, who takes in washing. Known to Associated Charities.

Survey No. 3488

Male, single, fifty-six years, born in United States. Until thirteen years old he went to school. Formerly he was a salesman and elevator operator. One year ago, locomotor ataxia affected his right leg. Now he walks with difficulty with the aid of a cane. As he was unable to return to his former work, he has peddled gum.

Survey No. 1998

Male, American, twenty-seven years; was born without fingers on either hand. He went to school until fourteen years old. Later he took a course in a business school. For a short time was bookkeeper, but was unable to get steady job, so for four

A judge in the municipal court who wrote his answers to the bar examination with a pencil held between his teeth

years has been exhibiting his own and his children's deformity (children born with same deformity) in side show of circuses. Wife living. Known to Social Agencies.

Survey No. 1623

Male, single, twenty-six years, born in United States. Left school at twelve years, having gone only four years. At age of nine was run over by car, which necessitated amputation of both legs, close to the thighs. Has no wheel-chair or artificial legs. Uses boots which are attached to small cart on wheels. Sold newspapers for a time, but for a number of years has stood on street corner mostly in the evening selling gum. During Christmas seasons he averages $38 a week; usually averages $15 to $20. Lives with his widowed mother. His mother said that he was spoiled and undisciplined because his family and friends felt so sorry for him. He has done as he pleased. Spends much of his time on the streets. Is very strong and able-bodied and could earn a living if trained.

Survey No. 2560

Male, forty-two years, born in United States. Received no schooling but can read and write. Was a laborer seven years. Met with accident at the age of thirty-nine years, which caused an infection resulting in the amputation of both legs below the knee. Has no artificial limbs; walks on his knees with two small canes. Because he found it difficult to find work, has been selling pencils for two years. Has a wife and two little children. Relatives support family in addition to what the man and his wife earn selling pencils in stores and offices.

Survey No. 3014

Male, fifty-six years, born in Poland; has been in United States twenty-two years. Went to school in Poland until ten years, speaks English. Was a helper in a car-shop for five years. At the age of thirty-three, met with a train accident which resulted in amputation of both legs above knees. Has no artificial limbs, and uses crutches, and has boots. For twenty-three years has sold shoe-strings and pencils; was unable to return to his former occupation and never tried for any other job. Man was married, but evidently deserted his family years ago; is a typical beggar and has no intention nor desire to work. Was taken care of by Santa Fé Railroad for six months after accident and was offered a life job but was too lazy to take it. Begged his way from California, where he was then living, and is still begging. Gives history of a wanderer; says he can speak Polish, Italian, French and Slavonian languages, and the only job he would consider is that of a teacher of foreign languages.

Survey No. 3453

Male, fifty-one years, born in Canada; in United States forty-eight years. Went to school until fourteen years old; was a driver of a coal wagon for three years. At the age of thirty-five, met with an accident at his occupation which resulted in the amputation of two fingers on left hand and partial disablement of entire left side. Uses a wheel-chair out-of-doors; walks on his knees in the house. Received no compensation and has been unable to return to work for ten years because of crippled condition. During that time has occasionally sold shoe-strings. Is married and has two children. His wife earns $3 a week, one son earns $7, and one daughter pays $3 a week board.

Survey No. 3499

Male, single, fifty-one years, born in United States. Has deformity of spine; is lame; and left arm is partly paralyzed, since birth. Walks with two crutches. Went five years to school. Tried to learn cigar-making but doctors advised his discontinuing it. Owned and drove a light express wagon for twenty years. Has been out of work twenty-four years because physically unfit for labor. Is unmarried and lives with a brother; peddles notions when weather permits.

VI. Method of House to House Canvass of Cleveland Cripple Survey

The field work of the Survey was begun October 17, 1915, and completed August 19, 1916. It consisted of visits of two types—the first to locate cripples; and the second to fill out the schedule. Two types of workers were used, canvassers and investigators.

The original plan had been to make a house to house canvass, but to be sure the results would warrant this expense, it was decided to choose a district, which would be fairly typical of the city, and try out the method.

Social agencies including nurses in factories and school nurses were visited first, and the plan and scope of the study fully explained to them. All were asked to send to the committee the names of families on their current lists indicating whether or not there were cripples among them. Cards with space for name of family and address, and space for name, age, and disability of cripples, with stamped envelopes for return, were given to all agencies. These cards when returned were kept in card catalog in the office, so that in giving out street lists to the canvassers, note not to visit could be added to these names.

The local staff at first consisted of stenographer, clerical worker, two canvassers, and the Assistant Director.

The Assistant Director was the only investigator at the beginning, but as the number of cripples increased, seven canvassers were added and five investigators. The investigators were young women of more experience than the average canvasser. For the follow-up visit they were given survey forms to fill out, covering the medical, educational, and industrial life of the cripple. The newness of the subject and need for uniformity in reporting necessitated continuous instruction to these workers. Each survey form filled out was gone over with them, and any information lacking as to use of the form was then supplied. Especially because of difficulties of non-medical workers in describing physical disability, it was necessary to see these investigators regularly, usually after they had completed one list of cripples. At first they had often to make two calls on a family to make the information accurate.

Canvassers visited every family in the district with the exception of those already known to the agencies and made daily returns on cards similar to those given the agencies. If a family was not at home on first visit, a second or third visit was made, if necessary. After a third visit a neighbor was consulted, but this occurred in a very small number of families, probably not more than fifteen to twenty in the entire city.

Weekly statistics were kept of numbers of families and cripples found by canvassers and as the numbers exceeded those reported by the agencies, more workers were added to the staff.

The canvassers, recent college graduates, with little practical experience, and one or two experienced visiting nurses were carefully instructed about approach to families, and at first reported to the office every day. The crippled conditions reported were discussed very carefully with them, in order to make sure they came under the definition accepted by the committee, and to avoid any unnecessary future visits to these families. During the entire survey, it was necessary to see the canvassers in conference two or three times a week.

There were almost no difficulties in visiting families, and the plan to have the investigators follow very closely after the canvassers was found possible as the work progressed and proved the satisfactory way. Any dissatisfaction on the part of the family as to the canvasser's approach could be easily corrected by the investigator. Families were found to be moving constantly, and when there was a cripple in the family, new addresses were secured before the moving by the canvassers, for the later use of investigators.

After a few months' canvassing, some canvassers became experienced enough to take up investigation, of course requiring close supervision at the start.

Newspapers helped in spreading news of the work, so that many families expected the canvasser. Through the kindness of the Austrian Consul, a description of the plan and purpose of the survey was translated into foreign languages, and published at intervals in the various foreign newspapers.

When canvassing of the first district was completed, results showed that the canvassers had found sixty-five per cent more cripples than were known to social agencies. The committee, therefore, decided to canvass the entire city. For convenience it was divided into seven added districts. Social agencies continued to send to the committee lists of families and cripples known to them in each district, and in addition to these, hospitals gave permission to consult their records two years back to secure the names of cripples not known to social workers. Very few of these cripples were found at the address recorded at the hospital, but later most of them were found at new addresses by the canvassers in their house to house visit.

As the Survey proceeded, district by district, the number of canvassers varied from seven to twenty-seven, and the investigators from seven to nine.

To make sure that the use of two types of workers was the most economical way of conducting the Survey, the experiment was tried for one week of sending out two investigators who not only did house to house canvassing, but, at the same time, filled out the schedule for each cripple found. This plan proved much more expensive in proportion to the results and was, therefore, discontinued. That is, the cost of visit per family was greater because the Survey workers were paid at a higher rate than the canvassers.

To make sure no cripples would be counted twice, as was quite possible with the varied spellings of foreign names, all cripples were registered temporarily at the clearing house for social agencies. This often obviated duplication.

Not a large number of cripples were incorrectly reported either by canvassers or agencies. In only one district did the proportion seem at all large, and as this was one of the poor lodging-house districts of the city, it was not surprising. Most of these mistakes were made here because families seemed to think that if they produced a cripple, even fictitiously, they would receive some reward.

In all the districts the people visited were invariably friendly and contributed largely to the success of the canvassing. All seemed eager to do their part. In foreign districts it was seldom difficult to get an interpreter, as English-speaking members of the family were glad to help out, and when it was impossible to secure an interpreter, in families or among neighbors, schools very kindly supplied older boys or girls to interpret.

Visits to about 150,000 families and the filling out of 4,186 schedules occupied nine months. Thirty-six canvassers and survey makers were employed for varying periods during this time, at a total cost of $6,040.82. Of this $3,035.26 was expended largely for salaries of canvassers, and $3,005.56 largely for salaries of investigators, making the cost for this part of the work average about $1.44 per schedule. This does not, of course, include salaries of director and assistant director, expenses of tabulating material and other expenses connected with the Survey earlier and later, but represents about half of the total expense.

The things to be emphasized in conclusion are:

1. House to house canvassing proved to be the most thorough and accurate method of locating cripples.

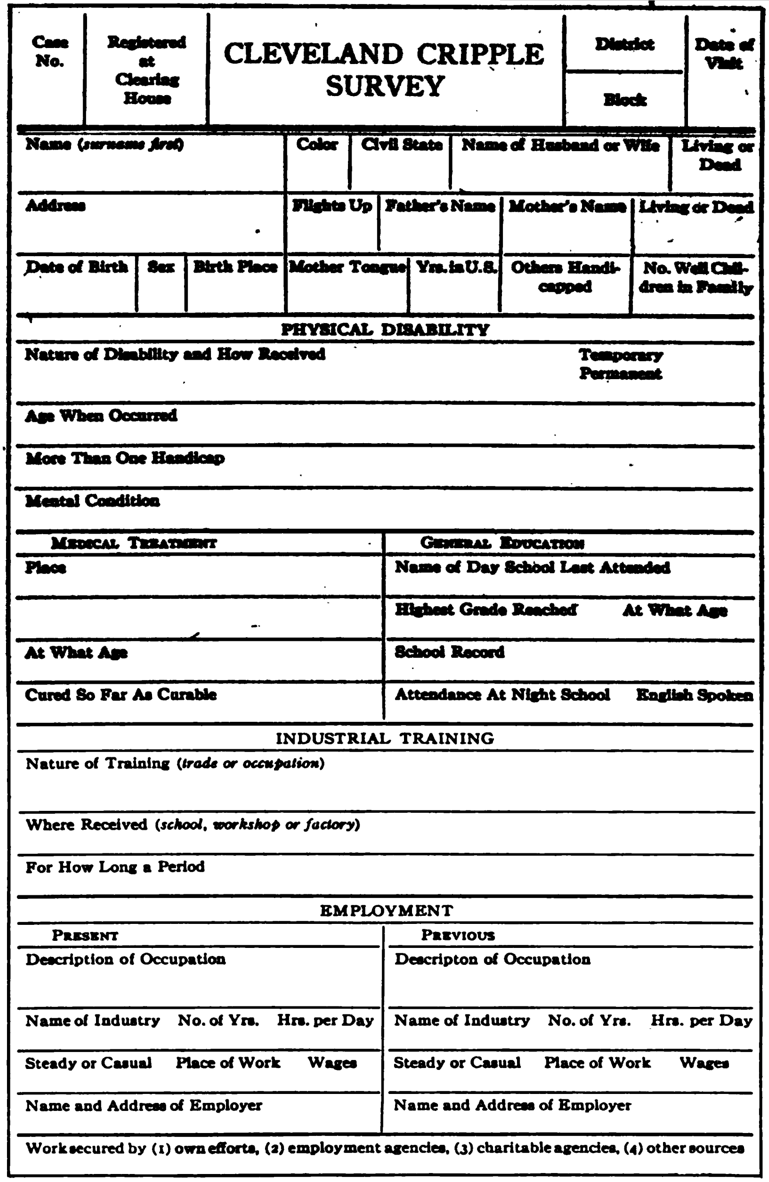
2. Addresses from hospital records proved to be of practically no use as families moved so often that the addresses were largely incorrect. More than eighty-five per cent. of cripples on hospital records were later found in the house to house canvassing.

3. All institutions may well be the last resource to visit because the families of cripples in institutions were located in the house to house canvassing, and it was usually necessary to visit them as well as the cripple in the institution to get an accurate social history.

4. Experienced social workers for investigators are most necessary—nurses with experience in medical social case work would be most valuable in the work.

5. It is desirable to have canvassers with at least some slight experience in investigation.

6. It was desirable to have substantial publicity through the daily papers in order to educate the community as the Survey progressed, and to insure a cordial reception of canvassers in every kind of home.



Case No.	**Registered at Clearing House**	CLEVELAND CRIPPLE SURVEY	**District** **Block**	**Date of Visit**

Name (*surname first*)	**Color**	**Civil State**	**Name of Husband or Wife**	**Living or Dead**

Address	**Flights Up**	**Father's Name**	**Mother's Name**	**Living or Dead**

Date of Birth	**Sex**	**Birth Place**	**Mother Tongue**	**Yrs. in U.S.**	**Others Handicapped**	**No. Well Children in Family**	

PHYSICAL DISABILITY

Nature of Disability and How Received **Temporary** **Permanent**

Age When Occurred

More Than One Handicap

Mental Condition

Medical Treatment	**General Education**
Place	**Name of Day School Last Attended**
	Highest Grade Reached **At What Age**
At What Age	**School Record**
Cured So Far As Curable	**Attendance At Night School** **English Spoken**

INDUSTRIAL TRAINING

Nature of Training (*trade or occupation*)

Where Received (*school, workshop or factory*)

For How Long a Period

EMPLOYMENT

Present	Previous
Description of Occupation	Descripton of Occupation
Name of Industry No. of Yrs. Hrs. per Day	Name of Industry No. of Yrs. Hrs. per Day
Steady or Casual Place of Work Wages	Steady or Casual Place of Work Wages
Name and Address of Employer	Name and Address of Employer

Work secured by (1) own efforts, (2) employment agencies, (3) charitable agencies, (4) other sources

Copy of Original Schedule Card (front)

In Case of Accident Was He Able to Return to His Former Occupation

Any Special Difficulty in Finding Work

Skill in Other Occupations

How Long Out of Work—Give Reasons

If Never Has Worked—Give Reasons	
Personal Attitude	Working Ability
Ambitious	Classify Under Instructions I, II, III, IV
Spoiled or Lazy	

Shy or Morbid

ECONOMIC CONDITION

Earning a Living or Dependent	Home Conditions
Supporting Others—How Many	Comfortable
Source of Support If Dependent	Poor
In Case of Accident, Amount of Compensation	Very Poor

Money Obtained by Begging Selling Shoe-strings or Pencils Exposing Deformity

INTERESTED AGENCIES

Remarks

Signature of Investigator

Copy of Original Schedule Card (back)

INSTRUCTIONS WITH ORIGINAL SCHEDULE [1]

PHYSICAL DISABILITY

Nature of disability and how received: (this question includes A, B and C)

Permanency of the disability to be determined by physicians

A. State which parts of the body are affected and to what extent, *i. e.*,
  - Total disuse of a member (right or left)
  - Partial disuse of a member (right or left)
  - Total or partial disablement of entire side, or upper or lower part of the body
  - Lack of one or more parts of the body

B. State how disability was received, *i. e.*, as result of disease, accident, congenital causes, amputation

If cripple or family know the cause, indicate according to the following classifications: (State who is source of information)

Disease:	Tuberculosis of bones and joints	
	Paralysis	paraplegia infantile paralysis obstetrical paralysis
	Rachitis with deformity—dwarfs	
	Arthritis	
	Progressive muscular atrophy	
	Pott's disease	
	Scoliosis	
	Sarcoma	
	Chronic osteomyelitis	
Accident:	Crush	
	Fracture	
	Burns	
	Bullet wounds, etc.	
Congenital:	Deformities—club hands or feet	
	Lack of a member of the body	

---

[1] Later supplemented by revised instructions, written and verbal.

- Rigidity of members
- Dislocations—shoulder—hip—knee—and combinations
- More parts than normal

Amputations:
- Right or left hand (or both)
- Right or left arm (or both)
- Right or left leg:
  - at thigh
  - between knee and thigh
  - below knee
- Right or left foot
- Two or more fingers—right or left hand

C. State limitations of movement under following classifications:

- Can walk without aid
  - easily
  - with difficulty
- Can walk with cane or canes
- Can walk with crutches
- Uses a wheel chair
- Is a bed case

More than one handicap:

Mention dual crippling defects:

Deafness, deaf mutism, defective eyesight, defective hearing, epilepsy, feeble-mindedness, cretinism, any nervous weaknesses, heart-trouble

MEDICAL TREATMENT

Give name and address of doctor, hospital, dispensary or institution

Present condition of cripple to be determined by physician

INDUSTRIAL TRAINING

Name school or institution where training was received

If in workshop or factory, mention where

EMPLOYMENT

Give description of work
Tell what parts of body are used to perform the work
State whether standing position at work
State whether seated position at work
What special skill is required

WORKING ABILITY

1. Those able to work under ordinary conditions and without special training
2. Those able to work under ordinary conditions if trained for selected trades or processes within trades
3. Those physically unfit for the long hours and hard conditions of competitive industry—but able to work under special conditions, *i. e.*, a special workshop for cripples
4. Those who are incapacitated for work other than occupation for its therapeutic value

ECONOMIC CONDITION

If head of a family, give number of children and ages

A LESSON LEARNED IN TABULATING FORM OF DISABILITY

In preliminary studies made before final forms of tabulation were decided upon, much more elaborate plans were tried out for getting the details of handicap—such as a specific statement whether fingers, hand or arm, foot, leg or hip were affected; whether the disability was right or left or above or below elbow or knee, etc. Attempts were also made to convey some impression of the degree of the limitation of movement in the part affected, whether it was total or partial, with any additional indication of limitation that might be suggested—by the use of appliances such as a cane or canes, brace or braces, crutch or crutches, or wheel chair. This detailed analysis was given up for various reasons, some of which it may be helpful to note here.

Not only were there serious practical difficulties in tabulating so many details in relation to other facts, but it became clear that some of the details were either relatively unimportant, or important only in relation to other facts, or so great a variation was shown in their relation to individuals as to make their consideration at this point almost irrelevant.

In the use of appliances, for example, conditions requiring them were now temporary, now permanent, sometimes of medical significance only; or the significance of their use varied with individuals, and as a whole seemed to have incredibly little bearing upon educational and industrial questions other than in mechanical matters of locomotion or transportation. A man with two crutches might make it a lifelong excuse for street-begging, while another would hold a foreman's job, or continue to direct his own business. Whether the disability was on right or left side, and above or below the elbow seemed to have little import except in relation to age at occurrence of disability and occupation, and was reserved for later special study in that connection. The individual variation in the use of right and left arms further limited the force of this distinction, and pointed to the need of such differentiation as that made use of by the California Industrial Accident Board in using the term 'major' and 'minor', to denote the arm affected. While closer study only emphasized limitations of motor power as the essential point in muscular and skeletal defect, the very general character of the information gathered in the enumeration necessarily gave little ground for estimating the degree of limitation of movement in any useful terms. It seemed a subject to be left for scientific estimate and report.

SUGGESTION FOR REVISED SCHEDULE

A suggestion for a revised schedule is given on page 179. It is to be used with an accompanying key which should define such terms as 'temporary' and 'permanent' handicap, maimed, etc., and outline the classification of disabilities agreed upon in advance—whether that classification be as simple as that employed in this report[2] or as full as that used for injuries by the California Industrial Accident Board and reprinted as follows:

INDUSTRIAL ACCIDENT COMMISSION
STATE OF CALIFORNIA

Code for Permanent Injuries

1. *Skull*
    1. Aperture of skull
    2. Paralysis (skull)
    3. Vertigo
    4. Neurosis
    5. Mental derangement
2. *Eye*
    1. Loss of sight both eyes
    2. Loss of sight of one eye plus impairment of other eye
    3. Impairment of vision of both eyes
    4. Enucleation of one eye
    5. Loss of sight of one eye
    6. Impairment of vision of one eye
    7. Injuries to eye not otherwise classified
    8. Enucleation of one eye plus impairment of other
3. *Ear*
    1. Complete deafness both ears
    2. Complete deafness one ear
    3. Partial deafness of one ear
    4. Loss of outer ear or part thereof
    5. Injuries to ear n. o. c.
    6. Partial deafness of both ears

[2] See General Table V, page 93.

REGISTER OF THE CRIPPLED

Name	Sex	Temporary Handicap	Permanent Handicap	Case No.

Color	Conjugal Condition	Name of Spouse

Year of Birth	Birthplace	How Long in United States	How Long in State

Lives Date	With	Address	City or Town

REFERENCES:

Nearest Relatives (*Names and, of Children, Ages*)
Last Employer (*With Date*)
Physicians (*With Dates*)
Hospitals or Clinics (*With Dates*)
Church (*With Date*)

GENERAL CONDITION (*Appears to be*)

Physical Mental	Good Good	Fair Fair	Infirm Infirm	Official Diagnosis	Name	Date

CHARACTER AND DISPOSITION (*Said to be*)	**APPEARANCE**— Artificial Limbs, Appliances, viz.:	Lame, viz.:	Maimed	Deformed

MUSCULAR OR SKELETAL DEFECT (*For Classification of Disability, See Key*)	Congenital	Disease, viz.:	Accident, viz.:	Age at Occurrence	Diagnosis Confirmed by (*Date*)

EDUCATION

None	Attended	Completed	Special Study or Trade	When
Common High Special, viz. School for the Crippled Other training				

SUPPORT	Wholly	Partly	Average Weekly Earnings	Employed Last Twelve Months	Years Employed
Occupation Before Handicap Since Handicap					
Family Income Pension			**RELIEF** Pub. Inst. Outdoor Relief Private Inst. Private Societies	Name	Date

Referred by Recorded by	Name	Address	Date

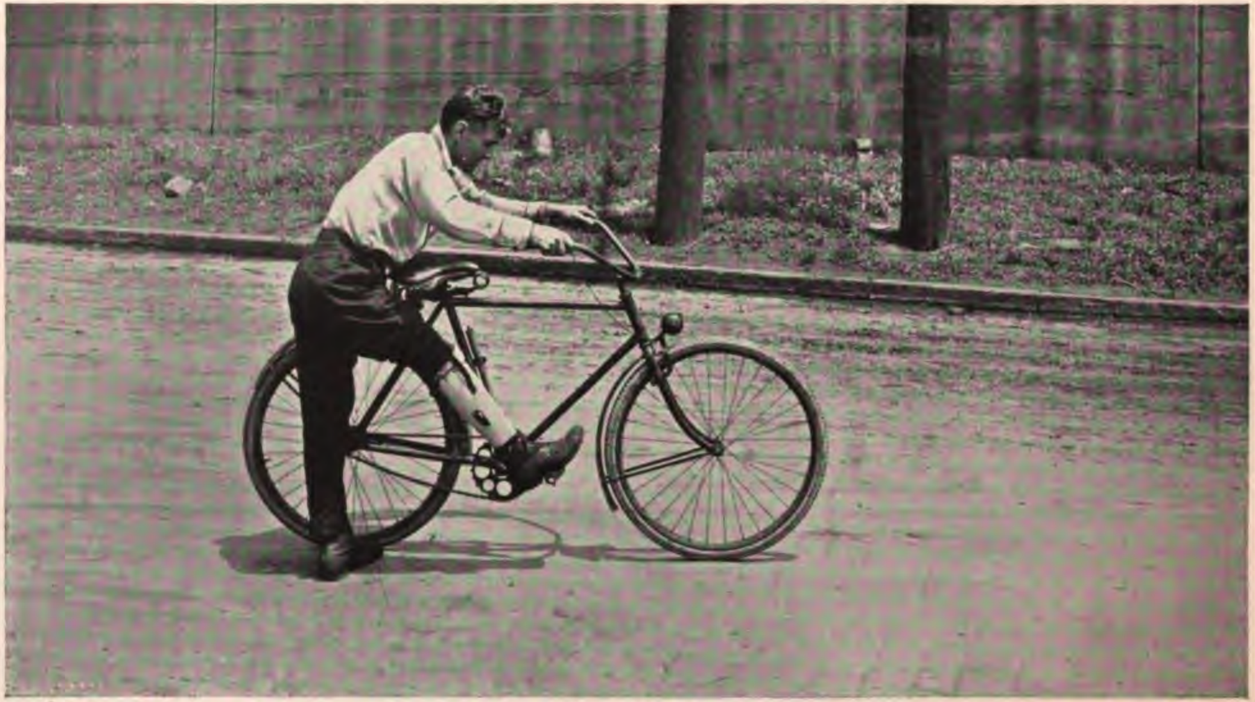
Suggestion for Revised Schedule. (Note single-face form, distinction between occupation before and after handicap, and plan for use of key for classification of disability)

4. *Face*
    1. Injury to jaws interfering with mastication of food
    2. Facial disfigurement n. o. c.
    3. Loss of any special sense n. o. c.—smell, taste, etc.

5. *Neck*
    1. Permanent injury to neck

6. *Chest*
    1. Permanent injury to chest

7. *Arms*
    1. Loss of both arms or parts thereof
    2. Loss of major arm above elbow
    3. Loss of minor arm above elbow
    4. Loss of major arm at elbow
    5. Loss of minor arm at elbow
    6. Loss of major arm between elbow and wrist
    7. Loss of minor arm between elbow and wrist
    8. Immobility of both shoulder joints
    9. Immobility of major shoulder joint
    10. Immobility of minor shoulder joint
    11. Immobility of both elbow joints
    12. Immobility of major elbow joint
    13. Immobility of minor elbow joint
    14. Immobility of major elbow and wrist
    15. Immobility of minor elbow and wrist
    16. Immobility of both wrist joints
    17. Immobility of major wrist joint
    18. Immobility of minor wrist joint
    19. Habitual dislocation of either shoulder
    20. Loss of rotation major arm
    21. Loss of rotation minor arm
    22. Immobility entire major arm-shoulder (elbow, wrist, and fingers)
    23. Immobility entire minor arm-shoulder (elbow, wrist, and fingers)



Loss of leg below the knee does not keep a factory patrolman from riding his bicycle

24. Immobility major wrist and fingers
25. Immobility minor wrist and fingers
26. Paresis major arm
27. Paresis minor arm
28. Immobility major elbow and fingers (Not wrist)
29. Immobility minor elbow and fingers (Not wrist)

8. *Hand*

    1. Loss of both hands at wrist joint
    2. Loss of major hand at wrist
    3. Loss of minor hand at wrist
    4. Loss of all or part of major hand in metacarpus
    5. Loss of all or part of minor hand in metacarpus

Single Finger Amputations

9. *Major Thumb*

    1. Thumb above the proximal joint
    2. Thumb above distal, not above proximal joint
    3. Thumb not above distal joint

10. *Minor Thumb*

    1. Thumb above proximal joint
    2. Thumb above distal, not above proximal joint
    3. Thumb not above distal

11. *Major Index*

    1. Index above proximal joint
    2. Index above second, not above proximal joint
    3. Index above distal, not above second joint
    4. Index not above distal

12. *Minor Index*

    1. Index above proximal joint
    2. Index above second, not above proximal joint
    3. Index above distal, not above second joint
    4. Index not above distal

Major Middle
    1. Middle above proximal joint
    2. Middle above second, not above proximal joint
    3. Middle above distal, not above second joint
    4. Middle not above distal

14. *Minor Middle*
    1. Middle above proximal joint
    2. Middle above second, not above proximal joint
    3. Middle above distal, not above second joint
    4. Middle not above distal

Major Ring
    1. Ring above proximal joint
    2. Ring above second, not above proximal joint
    3. Ring above distal, not above second joint
    4. Ring not above distal joint

16. *Minor Ring*
    1. Ring above proximal joint
    2. Ring above second, not above proximal joint
    3. Ring above distal, not above second joint
    4. Ring not above distal joint

17. *Major Little*
    1. Little above proximal joint
    2. Little above second, not above proximal joint
    3. Little above distal, not above second joint
    4. Little not above distal joint

18. *Minor Little*
    1. Little above proximal joint
    2. Little above second, not above proximal joint
    3. Little above distal, not above second joint
    4. Little not above distal joint

19. *Amputations of Two Fingers or Parts Thereof*

1. Thumb and index major hand
2. Thumb and index minor hand
3. Thumb and middle major hand
4. Thumb and middle minor hand
5. Thumb and ring major hand
6. Thumb and ring minor hand
7. Thumb and little major hand
8. Thumb and little minor hand
9. Index and middle major hand
10. Index and middle minor hand
11. Index and ring major hand
12. Index and ring minor hand
13. Index and little major hand
14. Index and little minor hand
15. Middle and ring major hand
16. Middle and ring minor hand
17. Middle and little major hand
18. Middle and little minor hand
19. Ring and little major hand
20. Ring and little minor hand

20. *Amputations of Three Fingers or Parts Thereof*

1. Thumb, index and middle major hand
2. Thumb, index and middle minor hand
3. Thumb, index and ring major hand
4. Thumb, index and ring minor hand
5. Thumb, index and little major hand
6. Thumb, index and little minor hand
7. Thumb, middle and ring major hand
8. Thumb, middle and ring minor hand
9. Thumb, middle and little major hand
10. Thumb, middle and little minor hand
11. Thumb, ring and little major hand
12. Thumb, ring and little minor hand
13. Index, middle and ring major hand
14. Index, middle and ring minor hand

15. **Index, middle and little major hand**
16. **Index, middle and little minor hand**
17. **Index, ring and little major hand**
18. **Index, ring and little minor hand**
19. **Middle, ring and little major hand**
20. **Middle, ring and little minor hand**

21. ***Amputation of Four Fingers or Parts Thereof***
    1. **Loss of all fingers except thumb major hand**
    2. **Loss of all fingers except thumb minor hand**
    3. **Loss of all fingers except index major hand**
    4. **Loss of all fingers except index minor hand**
    5. **Loss of all fingers except middle major hand**
    6. **Loss of all fingers except middle minor hand**
    7. **Loss of all fingers except ring major hand**
    8. **Loss of all fingers except ring minor hand**
    9. **Loss of all fingers except little major hand**
    10. **Loss of all fingers except little minor hand**

22. ***Amputation of Five Fingers or Parts Thereof***
    1. **Loss of all fingers, including thumb major hand**
    2. Loss of all fingers, including thumb minor hand

23. *Combination Loss and Ankylosis of Fingers*
    1. One finger major hand
    2. One finger minor hand
    3. Two fingers major hand
    4. Two fingers minor hand
    5. Three fingers major hand
    6. Three fingers minor hand
    7. Four fingers major hand
    8. Four fingers minor hand
    9. Five fingers major hand
    10. Five fingers minor hand

24. *Ankylosis, Curvature, or Contracture, One Joint or More of Fingers*
    1. One finger major hand

2. One finger minor hand
3. Two fingers major hand
4. Two fingers minor hand
5. Three fingers major hand
6. Three fingers minor hand
7. Four fingers major hand
8. Four fingers minor hand
9. Five fingers major hand
10. Five fingers minor hand

25. *Injuries to Both Hands*

1. Injuries to both hands (includes loss of fingers both hands; also ankylosed fingers both hands)

26. *Finger Injuries not Otherwise Classified*

1. Includes anaesthesia, paraesthesia, etc.

27. *Spine*

1. Permanent injury to spine

28. *Abdomen*

1. Permanent injury to abdomen

29. *Pelvis*

1. Permanent injury to pelvis

30. *Leg Amputations*

1. Loss of both legs at or above knee
2. Loss of both legs between knee and ankle
3. Loss of both legs n. o. c.
4. Loss of both feet in the tarsus
5. Loss of both feet in metatarsus
6. Loss of one leg at or above knee joint
7. Loss of one leg between knee and ankle
8. Loss of one foot in tarsus
9. Loss of one foot in metatarsus

31. *Toe Amputations*
    1. **Loss of great toe or part thereof**
    2. **Loss of all toes of one foot**
    3. **Loss of all toes except great toe**
    4. **Loss of any toe except great toe**
    5. **Loss of more than one toe n. o. c.**
    6. **Loss of two or more toes both feet**
    7. **Loss and ankylosis combined**
    8. **All other toe injuries n. o. c.**

32. ***Loss of Function of Joints of Leg***
    1. **Ankylosis of both hip joints**
    2. **Ankylosis of both knee joints**
    3. **Ankylosis of both ankle joints**
    4. **Ankylosis of hip and knee joints**
    5. **Ankylosis of knee and ankle joints**
    6. **Chronic instability or looseness of knee joint**
    7. **Chronic instability or looseness of ankle joint**
    8. **Faulty union causing shortening of the leg**
    9. **Faulty union causing permanent lameness one leg**
    10. **Traumatic flat foot**
    11. Ankylosis of toe joints
    12. Injuries to one leg n. o. c.
    13. Ankylosis—one knee joint
    14. Ankylosis—one hip joint
    15. Ankylosis—one ankle joint
    16. Faulty union causing permanent lameness both legs
    17. Injuries to both legs n. o. c.
    18. Ankylosis hip and ankle—not knee

33. *Burns of Body and Extremities*
    1. Second degree burns of body and extremities

34. *Multiple Injuries*
    1. Injuries occurring to two or more parts of the body that cannot be grouped under any above heading

35. *Miscellaneous Injuries*
    1. Miscellaneous injuries

VII. Cleveland Resources for Cripples

Holy Cross House for Crippled and Invalid Children, 9014 Cedar Avenue, S. E. Organized 1903. Newly incorporated 1913. To provide home, medical, and surgical care, also common school education and instruction in useful occupations for crippled and invalid white children of both sexes. Under the Episcopal Diocese. Work carried on under the auspices of the Sisters of the Transfiguration of the Episcopal Church. Moved from 5609 Whittier Avenue in December, 1916, to the building formerly the Infants' Rest, to which a $54,000 two-story, fireproof addition had been built. Capacity, fifty children. Supported entirely by voluntary gifts.

Rt. Rev. W. A. Leonard, D.D. . . . . *President*
Richard Inglis, Esq. . . . . *Secretary*
Charles E. Brooks . . . . *Treasurer*

F. E. Abbott
H. G. Dalton
Robert Clark
W. H. Hunt
Ralph King
T. E. Smith
Robert West
Rev. Robert Woodroofe

LADIES' BOARD

Miss Katherine Mather
Mrs. Walter Breed
Mrs. Rollin H. White
Mrs. Belden Seymour
Mrs. J. B. Zerbe
Mrs. Robert Clark
Mrs. J. F. Whitelaw
Mrs. A. C. Horde
Mrs. Price McKinney
Mrs. W. P. Palmer
Mrs. D. E. Dangler
Mrs. R. W. Woodroofe
Mrs. B. W. Housum
Mrs. H. E. Meyers
Mrs. Frank Meade
Mrs. A. H. Diebold

The Rainbow Hospital for Crippled and Convalescent Children, South Euclid, Ohio; office, 801 Garfield Building, Cleveland. Organized 1891. Incorporated as Rainbow Cottage 1896. Reincorporated as The Rainbow Hospital for Crippled and Convalescent Children in 1913. For the care of crippled and convalescent children of any nationality, color or religion between the ages of two and one-half and fourteen years. No fixed charges or admission fee; parents are expected to make small payments when possible.

Has sixty beds, forty for orthopedic and twenty for medical cases. In summer, with 'outdoor ward', can take care of eighty-five patients. In the year ending September 30, 1917, gave 23,413 days of treatment and training to 220 convalescent and crippled children. Two teachers are employed, and common school education and vocational training in pottery, basket weaving, carpentry, sewing, knitting, and metal work are given to each child, in either the schoolrooms or in the wards. The Hospital has thirteen acres of land, and nature study is a special feature. One visiting nurse and one social worker give their entire time to follow-up work in the homes of discharged patients.

Mrs. Robert H. Crowell	*President*
Mrs. Henry Sherman, Jr.	*Vice-President*
Mrs. B. F. Bourne	*Vice-President*
Mrs. S. Lewis Smith	*Treasurer*
Miss Adele Chisholm	*Assistant Treasurer*
Miss Elisabeth Billings	*Secretary*
Mrs. Andre T. Chisholm	*Financial Secretary*
Miss Mary B. Wilson	*Superintendent*

Supported by invested funds, income from voluntary subscriptions and donations, and small amounts from parents of patients.

Sunbeam Association for Cripples. For the welfare and industrial training of cripples, to assist them in securing independence and self-support.

In 1889 organized as Sunbeam Circle.

In 1902 incorporated.

Maintained the only school for crippled children in the city.

In 1910 the Board of Education accepted the responsibility of the special school building and provided the teaching force, the Sunbeam Circle providing the buses for transportation, the lunches, and social service nurse.

In 1912 the Board of Education assumed entire responsibility.

In 1915 name changed to Sunbeam Association for Crippled; industrial training for cripples planned, and Survey of Cripples undertaken in co-operation with the Cripple Survey Committee of the Welfare Federation; this Association assisting to the extent of $5,500.

Since 1915 has maintained a training school, the Sunbeam Industrial Shop, 5511 Euclid Avenue, for thirteen crippled girls and women, and supervised work in the homes of twenty-one others. In the year ending September 30, 1917, 650 children's garments were turned out by this shop, and the demand exceeds the supply. In the past year the Association did educational, industrial, and social work for 213 cripples.

Miss SELMA SULLIVAN	*President*
Mrs. E. M. WILLIAMS	*Vice-President*
Mrs. HERBERT W. STRONG	*Vice-President*
Miss MAY COFFINBERRY	*Treasurer*
Mrs. JOSEPH H. NASH	*Secretary*
Mrs. HENRY C. OSBORN	*Chairman Industrial Committee*
Mrs. CLARENCE L. COLLENS	*Chairman Social Service Committee*

WILLSON SCHOOL FOR CRIPPLED CHILDREN—East Fifty-fifth Street and White Avenue. Started and maintained for many years by the Sunbeam Association for Cripples as the Sunbeam School for Crippled Children. In 1910 the Board of Education assumed control of the educational part of the work, and the school opened in a building constructed for its use by the Board of Education on the grounds of the Willson School.

For several years the Sunbeam Association continued to provide transportation, nourishing lunches, and a visiting nurse, also arranged for a two weeks' outing for each child during the summer, usually at Rainbow Hospital.

In September, 1913, the Board of Education assumed the entire responsibility for the School, and its name was changed to the Willson School for Crippled Children. Noon lunches are paid for by the Board of Education and supervised by the Supervisor of School Lunches. The Philanthropy Committee of the Federation of Women's Clubs, of which Mrs. Duane H. Tilden is chairman, has the contract for these lunches.

During the first term of 1917–1918, 120 children were enrolled. Grades are from kindergarten through the eighth. Five grammar school teachers, one kindergartner, part-time sewing and drawing teachers, two girls employed as helpers for the children, and the principal, Miss Alice Christianar, constitute the staff. Hours are from 9:30–3:00. The general school curriculum is followed except that more handwork is done. As soon as a pupil is strong enough he is sent to the regular school; consequently few students have been graduated from this school.

The school is under the care of one of the school physicians, and a school nurse is assigned to it for part of her time. The school also has the benefit of part time of a special teacher of physical training who is an expert in correction of orthopedic defects and in massage. The orthopedic nurse of Lakeside Hospital also makes regular visits to the school.

OHIO LEGISLATION FOR CARE AND EDUCATION OF CRIPPLED CHILDREN

(House Bill No. 66)

AN ACT

To amend Sections 2073 and 2074 of the General Code relative to an institution for deformed and crippled children

Be it enacted by the General Assembly of the State of Ohio:

SECTION 1. That sections 2073 and 2074 of the General Code be amended to read as follows:

Section 2073. A commission composed of the governor, auditor of state and three persons resident of the state, to be appointed by the governor, not more than three members of which commission shall belong to one political party, is hereby established, and on behalf of the state is directed to select from lands now owned by the state of Ohio; or, in event no lands suitable for the purpose are available; then, to select and purchase a tract of land, in this state, which tract shall be of such size as the commission deems advisable, and which shall be suitable for the location of a state institution, to be known and designated as the Ohio Institution for the Treatment and Education of Deformed and Crippled Children.

Section 2074. The commission shall adopt plans and specifications, prepare estimates of cost and construction, accept donations, let contracts for and cause to be constructed on such lands the necessary buildings and structures, at a total cost not to exceed the amount appropriated for that purpose, for the medical and surgical treatment and polytechnic and literary education, of the indigent crippled and deformed children of the state, under the age of eighteen years.

SECTION 2. That said original sections 2073 and 2074 of the General Code be, and the same are hereby repealed.

E. J. HOPPLE,
Speaker of the House of Representatives
EARL D. BLOOM,
President of the Senate

Passed March 20, 1917
Approved March 28, 1917
JAMES M. COX, *Governor*
Filed in office of Secretary of State
March 29, 1917

(House Bill No. 182)

AN ACT

To amend sections 7755, 7756, 7757, 7758, 7759, 7760, and 7761 of the General Code, relative to the establishment of public schools for the blind

Be it enacted by the General Assembly of the State of Ohio:

SECTION 1. That sections 7755, 7756, 7757, 7758, 7759, 7760, and 7761 of the General Code be amended to read as follows:

Section 7755. Upon application by a board of education of any school district in Ohio to the state superintendent of public instruction he shall grant permission to such board and it may thereupon establish and maintain within its limits one or more schools at an average attendance of not less than three pupils for the instruction of deaf or blind persons, residents of this state, over the age of three, and of *crippled persons*, residents of this state, over the age of five. Upon application by any board of education of the school district in which such schools for the education of the blind shall be established and maintained to the state superintendent of public instruction, he shall grant permission to such board of education and it may thereupon pay for the board of any blind persons residents of this state under the age of twenty-one. Provided, that by so doing the board of education is enabled to further its educational plan for blind children, and provided that such blind persons are not boarded in the homes of their parents or legal guardians, and further provided, that such blind persons are under the training of a person or persons designated by such board of education to give such training. At no time shall the number of blind persons residents of the school district in which such school or schools for the blind are maintained who are so boarded at the expense of the board of education exceed one-fourth of the total enrollment for the year of such school or schools, and no person shall be boarded for more than one year without special permission of the state superintendent of public instruction.

Section 7756. A board of education which maintains one or more schools for the instruction of deaf, *crippled* or blind persons shall report to the state superintendent of public instruction annually, and as often as such superintendent directs, such facts concerning such school or schools as he requires.

Section 7757. At the close of each school year each board of education of the school district in which such schools for the education of the deaf, *crippled* or blind shall be established and maintained, shall certify to the auditor of state the number of persons given instruction in said schools or boarded at the expense of such board of education during the preceding school year and thereupon the auditor of state shall draw his warrant upon the treasurer of state in favor of such board of education, payable out of the general state fund in an amount equal to one hundred and fifty dollars for each deaf or *crippled* pupil given instruction in such schools within said district for nine months during said school year, and a proportionate amount for each deaf or *crippled* pupil given instructions therein for a part of said school year less than nine months, and the sum of two hundred and fifty dollars for each blind person given instruction in such schools within such districts for nine

months during said school year, and a proportionate amount for each blind person given instruction therein for a part of said school year more or less than nine months and two hundred and fifty dollars additional for each blind person boarded at the expense of such board of education for nine months during said school year and a proportionate amount for each blind person so boarded for a part of said school year more or less than nine months.

Section 7758. **The sums provided in the next preceding section shall be paid by such state treasurer upon the presentation of such warrant or order upon satisfactory proof made to him by the president or clerk of the board of education maintaining such school, of the number of persons boarded or instructed therein, their residence, and the period of time such persons were so boarded or instructed in such school or schools the preceding school year, and upon certification by the state superintendent of public instruction that the inspection provided for in section 7761 had shown these schools to be operating under satisfactory conditions.**

Section 7759. **Teachers in such schools shall be appointed** as are other public school teachers. They shall possess the usual qualifications required of teachers in the public schools, and in addition thereto such special training and equipment as the state superintendent of public instruction or the board of education may require. The so-called oral system shall be taught by such teachers in such schools for the deaf. If, after a fair trial of nine months, any of such children in any school for the deaf for any reason are unable to learn such method, then they may be taught the manual method in a separate school, providing however that there are not fewer pupils than provided in section 7755 of the General Code.

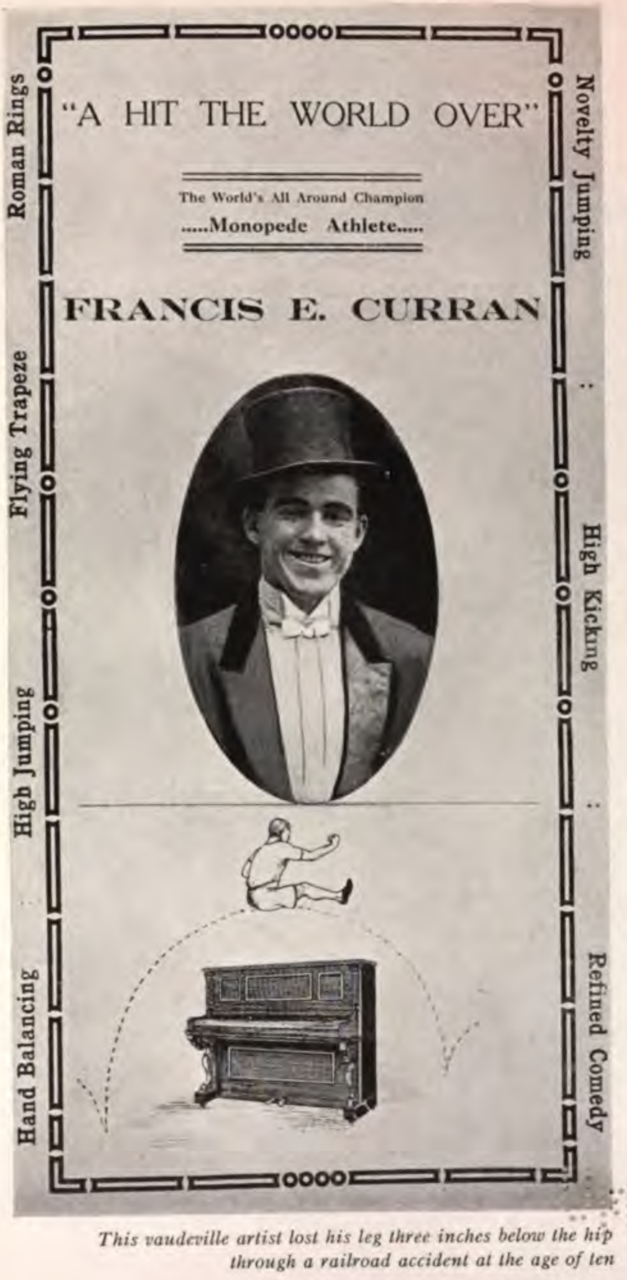
Section 7760. For the purpose hereof, any person of sound mind, who, by reason of defective hearing or defective vision, or so *crippled* as to be physically unable to care for himself without assistance, cannot profitably or safely be educated in the public schools as other children, shall be considered as deaf, blind, or *crippled* and after the establishment of any such school by any school district, may be compelled to attend such school or a state institution.

Section 7761. The state superintendent of public instruction shall select some competent person or persons to inspect all such schools for deaf, blind and *crippled* persons established by virtue of this act, and cause inspection to be made at least twice a year or as often as the state superintendent of public instruction may deem necessary concerning the method of instruction, the condition of the buildings in which the schools are held, the conditions under which such schools are maintained, the conditions under which such blind persons are boarded, and such other matters as may be of interest in the education of such children in such schools; and such person or persons so appointed shall make full report thereof in writing to the state superintendent of public instruction at the close of each school year. The state superintendent of public instruction shall prescribe certain standard requirements concerning the conditions under which such school or schools for the blind or *crippled* are conducted, the methods of instruction and supervision, the qualifications of teachers and the conditions under which they are employed, the conditions of the buildings in which the schools are held and the conditions under which any blind person is boarded at the expense of a board of education of a school district in which a school for the blind has been established and maintained. When upon inspection it has been found that the standard requirements theretofore prescribed for the instruction and boarding of blind persons have not been complied with by a board of education, the state superintendent of public instruction shall recommend to the auditor of state that the payment to such board of education provided for in section 7757 be withheld, and thereupon the auditor of state shall refuse to draw his warrant upon the treasurer of state for the amount to which such board of education of a school district maintaining a school for the blind would otherwise be entitled.

SECTION 2. That original sections 7755, 7756, 7757, 7758, 7759, 7760 and 7761 of the General Code be, and the same are hereby repealed.

E. J. HOPPLE,
Speaker of the House of Representatives
J. H. MILLER,
President pro tem. of the Senate

Passed March 7, 1917
Approved March 19, 1917
JAMES M. COX, *Governor*
Filed in office of Secretary of State,
March 29, 1917



"A HIT THE WORLD OVER"

The World's All Around Champion

.....Monopede Athlete.....

FRANCIS E. CURRAN

Roman Rings

Flying Trapeze

High Jumping

Hand Balancing

Novelty Jumping

High Kicking

Refined Comedy

This vaudeville artist lost his leg three inches below the hip through a railroad accident at the age of ten

VIII. The Massachusetts Hospital School at Canton

The Massachusetts Hospital School is a school with hospital facilities: (1) for educating temporary cripples during convalescence, (2) for educating permanent cripples, if of the helpable or improvable type. The characteristic features of a hospital school which are especially significant to this study are:

1. The preventive aspect, that is, the abolishing of the condition in temporary cripples. This means the reduction of the degree of handicap, even to complete recovery, as in the case of children deformed by rickets, malnutrition, club feet, tuberculous joints and Potts' disease, so that children who have suffered from these disabilities may return to their normal place in the public schools.
2. The building up of the general health of all crippled children by active outdoor life.
3. The consideration of the mental element with physical handicap.
4. Vocational training by the apprenticeship system. These characteristics are perhaps best brought out by direct quotation from various reports of the Massachusetts Hospital School at Canton.

THE PREVENTIVE ASPECT, 1914

The annual report for 1914 states: "Fifty-five children, of whom thirty-nine were counted as discharged and sixteen as being on trial or on visit at the end of the year, were dismissed during the year. Thirty-five left to enter the public schools with normal children or to become self-supporting. The majority of all who have left the school take a pardonable pride in its welfare and feel a personal responsibility for its success. Those who live near-by have returned many times to visit, to have braces or splints repaired or adjusted, or to report the progress they are making in school or at self-support. Those who have been unable to return have kept in touch with the school by correspondence with remaining friends, by our letters of inquiry, perhaps by their enthusiasm in the baseball team, or their general interest in the progress of the school. Twenty-one children, after an average residence of three years, four months and twenty days, either recovered or were so much improved that they were discharged to enter the public schools. Some had never attended school previous to admission, and nearly all maintained the public school standard while recovery was taking place. One boy, whose case is by no means an exceptional one, was admitted at the age of five years. He was suffering from tuberculosis of the spine and had never attended school. He attended the outdoor school first on a Bradford bed frame and later in successive plaster-of-paris jackets. When recovery occurred, he entered the public school in practically the same grade he would have been in had he never left home. It should be borne in mind that such cases cannot remain in a general hospital on account of the long period of convalescence, and that treatment at home is not only unsatisfactory, but without educational advantages. Such cases appeal to us from the humanitarian point of view, but the work of the school is also of distinct economic value to the State. The cost of caring for this boy is insignificant compared with the expense of maintaining an ignorant hunchback through life. Five of those who were dismissed to continue their education with normal children left with the school diploma, four have entered high schools, and one has entered a commercial college. Fourteen children, after an average residence of four years, six months and ten days, left to seek employment, of whom two are self-maintaining at poultry raising and farm work, two as operatives in large factories, one as a printer, two as licensed firemen, one as a crossing tender and railroad station employee, one as an express messenger, one as an inspector of work in an apron factory, one at office work in a hotel, two at domestic work, and one, not regularly employed on account of ill-health and lack of ambition, is earning occasional sums as a cornetist in an orchestra. Of the remaining dismissals, nine were mentally deficient, one was found to be insane and two were suffering from progressive forms of paralysis; the parents of one child objected to having bills sent to the place of settlement; parents were unhappy when three of the boys left home; one homesick boy was not returned from vacation; and three children died."

THE PREVENTIVE ASPECT, 1915

The annual report for 1915 states: "As a rule the cases of hip-disease seen at the school are of the most severe type, which have been treated at first at various hospitals or neglected at home, and sent to the school only as a last resort. They represent the most unfavorable cases as a class, many having faulty inheritance and also being enfeebled by unsanitary environment.

"That even the worst cases of hip-disease are benefited by the conditions of care and environment at the school would appear to be true from the record of increasing weight seen in all cases, even in those bedridden hospital patients with general infection, amyloid kidney and liver, which finally proved fatal.

"It is not only by furnishing them food and fresh air that patients suffering from hip-disease can best be aided to a recovery of health. Muscular activity is normal in a child and is beneficial in stimulating the circulation and in promoting the proper tissue changes necessary to health.

"By appropriate treatment the following results have been obtained:

"1. In the most favorable cases, when treatment is begun early and is thoroughly carried out under favorable conditions, complete and permanent cure without deformity and without limb disability.

"2. An arrest of the destructible process and a cure, with correction of the deformity and no greater disability than that furnished by such shortening and impaired function as is due to the bone change which developed before treatment was undertaken.

"The school curriculum for the grades has been arranged to conform as closely as possible to that followed in the public schools, so that the children with hip-disease and others in the tuberculous group, who may be generally regarded as temporarily crippled only, may eventually take up the regular school work when they return to their homes. In several instances pupils of this type have been prepared for high schools during the time they have been under treatment. Vocational training is being developed more particularly for those permanently disabled, of whom the school already has a number of self-supporting graduates."

DISCHARGED CASES

"Sixty cases were discharged during the year, including fifteen who were nominally returned from trial visits of previous years. Twenty left to continue their education in the public or private schools after an average residence of three and one-half years, their average age being eleven years and eight months. Six boys were capable of self-support, having been trained as follows: one as a licensed fireman; one became proficient in the operation of steam laundry machinery; one found employment as a clerk in a store; one as an assistant to a job printer; one secured employment as a gardener's assistant; and one, a legless boy without friends to assist him in finding employment, is acting as telephone operator at the school until a better opportunity can be found. Four were regarded as capable of partial self-support. A girl with but one leg, which was partially paralyzed, and who was confined to a wheel chair, was very skillful in needlework; a boy with extensive paralysis of legs, arms and back, but with a bright and well-trained mind, looked forward to the management of a newsstand and cigar store; and two spastic paralytics, not keen mentally but able to do work of a simple kind, left to go under mild supervision in private families. Four were mentally deficient. Seven were taken against advice to satisfy parents who were either lonesome without their children or ambitious because of marked improvement to have them continue some special study at home. Seven failed to return from visits and they were accordingly discharged at the close of the year. Four were taken by parents because of misunderstanding over settlement matters with local authorities or a feeling that public relief meant pauperization. Two were discharged on account of homesickness, one of whom has since asked to be allowed to return. Two were discharged to leave the State; one, suffering from a progressive form of paralysis, was transferred to another institution; and three children died. Death was due in all three cases to tuberculosis of long standing, which finally terminated in general tuberculosis and amyloid disease.

"It is of interest to note that fifteen of those discharged during the year left with the school diploma, and that nine have entered high or technical schools or business colleges."

THE PREVENTIVE ASPECT, 1916

The annual report for 1916 states:

"A few illustrative cases may be of interest:

"K., a young boy twelve years of age, of Polish birth, was admitted to the school, afflicted with the paralytic deformities following an attack of poliomyelitis ten years before. He was confined to the sitting position, his lower limbs were drawn up under him, and his position resembled that of a Hindoo idol. The legs could be pulled partially straight, but the contracted tendons and skin prevented this except to a limited degree. The boy was virtually a helpless dependent. By proper measures carefully employed, the limbs were gradually straightened, and at present, with the use of crutches and light apparatus, the boy, now nineteen years of age, is an active pupil at his school and trade work, and takes part in the activities of the school, going about everywhere with the other pupils. He is able to be self-supporting as a cobbler.

"The following cases have been selected as fairly representative of others equally successful, and of the type the school is organized to relieve and assist:

"A strong, healthy boy of bright promise suffered from an attack of infantile paralysis at the age of twelve years. The disease left him extensively paralyzed. He was confined to a wheel chair for about a year, and at time of admission some deformities had occurred, especially of the back. There was marked atrophy and loss of power in both legs and the muscles of the trunk. The large extensor muscles of the thigh, the adductors and those which flex the knees were completely paralyzed. The muscles of one hand and those of the opposite shoulder were also involved, but fortunately not enough to prevent the use of crutches, and by the aid of double steel splints attached to a stiff leather corset he learned to walk. By nature a cheerful and ambitious boy, he never lost courage during many months of muscle training and other essential treatment requiring most patient and persistent effort. When he entered the grades, he was also assigned to the class in cobbling, where he became very skillful in the manufacture of moccasins, for which he found a ready sale in one of the leading shoe stores of Boston. He realized the importance of learning how to do more than one kind of work, and when he gained an insight into bookkeeping in the eighth grade, naturally his mind turned at once to clerical work in the main office. He found time to learn something of typewriting and stenography and showed rare good judgment in receiving and distributing telephone calls. He was actively interested in the social life of the school as president of one of the boys' clubs and leader of the school band. Today he is successfully employed as telephone operator at the private branch exchange of one of the large State hospitals. (No. 363.)

"A fifteen-year-old girl suffered from a tuberculous invasion of the hip joint. It was at first thought necessary to care for her in her own home, but as she lived on a farm several miles from the family physician it was impossible to give her the constant attention her condition demanded. Symptoms progressively increased until the disease was far advanced and her condition reached a critical stage. After several unsuccessful attempts to get her into a general hospital, and as a last resort, she came here as a special case. There was found to be a very large and deep abscess formation about the hip joint, and the X-ray showed that some destruction of the bone had already taken place. Mechanical rest secured by the recumbent position upon a bed frame and carefully adjusted traction to correct the deformity and remove pressure from the affected bones gave almost immediate relief. The high temperature gradually subsided, opiates were withdrawn, and the patient was soon allowed to attend brief outdoor sessions of school, with the hip joint protected by a traction abduction splint. The large abscesses were drained and healed in about three months. She wore the ambulatory splint with high sole and crutches until new bone formation gave her a strong serviceable hip. The splint was gradually withdrawn as the muscles of the affected limb regained their normal tone, and the girl was discharged recovered.

"During the three years she was under treatment, she acquired a practical knowledge of housekeeping at the domestic science cottage, became an enthusiastic member of the mandolin club, learned to repair and make her own clothing, and completed the prescribed course of study in the grades which enabled her to enter high school when she returned to her home.

"It is very gratifying to see this happy girl today without any form of support or apparatus and walking without perceptible lameness; but the case is deserving of mention, not especially to emphasize her splendid recovery, but to illustrate the opportunities for an education while convalescence and recovery are taking place. (No. 414.)

"This most important feature of the school is still further shown by a fifteen-year-old boy who came in with tuberculosis of the knee joint of long standing. He also made a complete recovery and left with the school diploma, to become self-supporting, although at one time before admission his condition was so serious that amputation seemed inevitable. A few months preceding his graduation he became interested in baking, and was given a chance to do practical work under the direction of the institution baker. When he left the school he entered the employ of a large baking establishment in the vicinity of Boston, and is looking forward to the time when he and his mother, who is a cook, can carry on their trades together. (No. 31.)

"Another graduate of the class of 1916, who was recently discharged to self-support as a licensed chauffeur, was admitted several years ago with chronic tuberculous disease of the knee joint. I happened to see the boy for the first time in a city almshouse some two years before the State had made any provision for the special care of such cases. He had then all the incipient symptoms of suppuration, and the prospect for the delicate, unhealthy-looking child was not good. He had been under observation in at least five different hospitals and institutions before he came to us and his health had been going from bad to worse. A long-continued period of rest to the leg as well as to the knee joint was secured by the use of leather and steel. He practically lived out-of-doors both day and night, and like most of our cases he attended school about one hour and a half each day. He is now perfectly well and in very active occupation. He can move his knee joint freely, there is no perceptible difference between his two legs, and it would be difficult for one who saw him a few years ago to conceive it possible that he could acquire the growth and muscular development which has taken place. (No. 26.)

"The next case, a boy of fifteen, represents more distinctly the type of cripple for which the school is popularly believed to be maintained, although experience teaches us to believe that most cases of bone tuberculosis when placed under the most favorable conditions in the early stages may be generally regarded as temporary cripples only, and that permanent disability from such causes will become increasingly less common.

"The previous history of this boy indicates that he was in excessively bad health from the age of two; that repeated efforts to save his leg by surgical operations were unsuccessful, and that it was finally amputated at a point within about four inches of the hip joint. Having spent most of his life in decided ill-health, and with a natural or an acquired dislike for study, he was sent to us for training which it was hoped would enable him to become a self-supporting citizen. It was first thought most essential to build up his general health. A happy, carefree life out-of-doors, regular hours of sleep, and a nutritious diet produced a most extraordinary change. In fact, it soon became a more difficult problem to direct his accumulated energies into the proper channels for his future welfare. His stump was too short for the attachment of an artificial leg which would be of any assistance. Nevertheless he became so skillful in the use of his crutches that he appeared to have no difficulty in getting about as quickly and as easily as the average normal boy of his age. He became active in the various branches of athletics, such as roller and ice skating, football, baseball, vaulting, jumping, and running, and the graceful precision with which he executed all his movements was admired by those who saw him at play. He was assigned to the tailoring class in addition to his regular school work, and after an apprenticeship of about a year he was discharged, to seek a position as a tailor's assistant, in which occupation he is now employed. (No. 418.)".

OUTDOOR LIFE

The annual report for 1914 states:-

"The first requisite, after providing food and lodging for these children, slum-stunted and shut-in as many of them have been, was pure air in unlimited quantity day and night. This was brought about not only in out-of-door playgrounds and out-of-door schoolrooms, but in dormitories which were as fresh at night as an out-of-door ball field, furnishing shelter and warmth when needed, but with roof ventilation as free as an Indian tepee. On inspection, these sleeping wards at midnight and in the early morning, although filled with forty sleeping children, were found fresher than any ordinary hospital ward furnished with flue ventilation, or the private room of even the best built house relying upon window ventilation. The value of this simple system of ventilation was demonstrated by smudge tests, and as compared with the regulation vent, either plenum or vacuum system, found to be far superior in actual use. The method was found applicable to a two-story building, and, as described in former reports, was used in the construction of the last two cottage dormitories.

"To this fresh-air treatment of previously shut-in children may be attributed one noticeable feature in the health of the members of the school, *viz.*, the unusual absence of colds, coughs or catarrhal affections which has been observed summer and winter in all the years since the opening of the school, and which cannot be regarded as accidental. In addition to this there has been a diminution and disappearance of enlarged adenoids in those children who were on entrance afflicted with this common respiratory affection. Surgical treatment of tonsils has been unnecessary.

"The results in the treatment of tuberculous disease of the hip, knee, and spine have been remarkable in the establishment of permanent serviceableness with little or no disability and much less deformity than is usually observed, and can be largely attributed to the pure-air treatment, the activity made possible by careful management, orthopedic treatment, and the resulting improved general condition.

"The stimulating influence of outdoor sports is of recognized value in the development of individual self-reliance and energy. It had not seemed to the trustees possible that much could be accomplished in a school for crippled children through the means of sports; but it was found not only that a baseball team could be organized but that it could be brought to such a state of excellence as to be often superior to a team made up of normal school boys of similar age."

THE MENTAL ELEMENT WITH PHYSICAL HANDICAP

"I am more and more convinced that the economic independence of crippled children depends even more upon the child's mental attitude toward a life of usefulness than upon the physical handicap. However skillful a cripple may be in any line of work, he can never be lifted out of the dependent class until he becomes weaned from the self-pitying, self-conscious, self-centered feeling which most crippled children have been taught to entertain. The solitary life of the crippled child at home does not afford the opportunity for healthy competition upon a footing of equality which the cripple must have to gain the self-assurance and the self-reliance to care for himself and manage his own affairs. If their disabilities are magnified by contact with normal persons only, especially during the impressionable developmental age, they are less inclined to become resourceful or to believe that independent action is possible. The usual objections made to institution life, as compared to home care for certain other dependent classes, do not apply with equal force to crippled and deformed children. In fact, the disadvantages might almost be reversed. Wholesome play, without too much supervision, and the companionship of others similarly afflicted encourage co-operation, self-sacrifice, and loyalty, which are of the greatest fundamental importance in the development of character. Practically all of the social activities known to boys and girls who are well are enjoyed by the children of the school, and spontaneous expressions of individual interests and ability form the basis upon which the vocational training is largely determined.

"In the paralytic group, unexpected results have followed the association of the crippled children with others equally or more disabled. The loss of self-pity, the readiness to make the most of their unimpaired faculties, the disappearance of self-consciousness directly attributable to collecting children in their play have proved to be most advantageous in the training of those handicapped by paralysis. A boy in a wheel chair flying his kite alone, a boy without legs or crutches walking in steel frames stimulate the newcomers fresh from homes in which they have been pitied and spoiled into an unnecessary feebleness."

VOCATIONAL TRAINING BY THE APPRENTICESHIP SYSTEM

The annual reports for 1914 and 1916 state:

"Practical industrial training for the older boys and girls has been carried into nearly every department of the institution in the belief that theoretical vocational instruction in the classroom for crippled children with the limitations of a grammar-school education is ill-advised. . . In the maintenance of an institution with a population of more than 300, a large number of skilled employees are required. Most kinds of work to be found in every small community are represented, and are sufficiently varied to be adapted to the capabilities of children from all stations of life.

"Carpenters, painters, engineers, bakers, cobblers, tailors, stenographers, telephone operators, dressmakers, cooks, teamsters, gardeners, housekeepers, laundresses, and many others can be developed here by an apprenticeship with experienced employees.

"Any reference to the teachers and the educational advantages of the school would be incomplete if it did not include many employees, by whose example and instruction the children have acquired skill upon work of great practical value. Any child who manifests interest in a particular branch of the work in the institution is usually given an opportunity to become a voluntary assistant or an apprentice to the employee who is held responsible for the work. An employee's efficiency is frequently measured by the number of pupils who find his work attractive; and whether it be gardener, engineer or farmer, stenographer, laundress or cook, each one who remains upon the pay-roll becomes in certain respects a teacher. There are vocational instructors who devote their whole time to teaching and are included in the educational department, but close reciprocal relations exist between all departments for the educational advancement of the pupils.

"The pupil who acts as an understudy to the telephone operator and is finally entrusted with the responsibility of receiving and distributing thousands of calls which pass through our switchboard, quickly becomes fired with an ambition to do the work as well as the paid employee. Moreover, he learns to appreciate the importance of efficient work, of the relationship between employer and employee, and the necessity of rendering service equivalent at least to value received. The value of such practical training is obvious and cannot be overestimated.

"None of the industrial departments is organized to be dependent upon the assistance of pupils, because it often happens that the same number of children or sometimes even none is found to be physically, educationally or temperamentally qualified for routine work. Their service is upon a purely voluntary basis, and the employee with whom a boy or girl does not ask to be associated is usually looked upon as more or less of a failure.

"As a possible aid to the vocational guidance and training of the children admitted, the assistance of parents, legal guardians and attending physicians has been sought. That the problem is a difficult one, and the subject vaguely understood, may be gained from the answers given for the children admitted during the past year in reply to the following: 'Can you suggest something in which you believe the child would be likely under suitable training to become proficient?' Forty, or seventy-one and three-sevenths per cent, had nothing to recommend, eight suggested vocal or instrumental music, others replied as follows: clay modeling and basket work; millinery; bookkeeping; printing and drawing; sewing; the use of tools; anything in which legs do not play a prominent part. The answers appeared to indicate the desire of the parents rather than any special aptitude of the children, as practically none was found to be adapted by talent or inclination for the work recommended."

One added characteristic should be emphasized—the keeping alive of the contact with the homes of the children. The 1915 report states:

"There were 258 children at the beginning of the year December 1, but the number quickly dropped to the minimum at Christmas time, when all who were able were given an opportunity to spend the holiday vacation in their homes. Home visits have been arranged and family ties strengthened whenever practicable, especially for those who should remain in the school for a number of years. Two hundred and fifty-nine such visits have been made, the total number of days' absences amounting to 2,540.

"Many of our pupils have relatives near, whom they often visit, and every week many parents come to see their children here; but at these times it is not possible to give a comprehensive view of the daily life of the pupil. The problem of bringing the parent and the school into a sympathetic understanding is best solved by presenting school methods and output for parental comment and consideration. We feel that such an exhibit is especially valuable for our more handicapped pupils, whose lives are necessarily more restricted. It was pleasant to see our wheel-chair cases beaming with pride as they escorted guests to see some well-planned piece of handicraft and afterward entertained them at tea. We feel that the net result to all is an increase of school spirit, an awakening of enthusiasm, and a broadening of the outlook toward our aim and end, the fitting of our boys and girls for busy and useful lives."

IX. Stories of Successful Individuals in Cleveland

A WHEEL-CHAIR DRESSMAKER

(See picture, facing page 216)

One of the most serious instances of crippling results of infantile paralysis that came to notice in the Survey was that of a young woman about thirty-six years old. At the age of three, she had been overtaken by the dreaded disease and as a result had never been able to walk. She had also a very noticeable deformity of the spine. Although her parents, who were progressive working people, had consulted many physicians in their own city, and she had undergone constant treatment, nothing seemed to help her physical condition, and she had become a wheel-chair invalid.

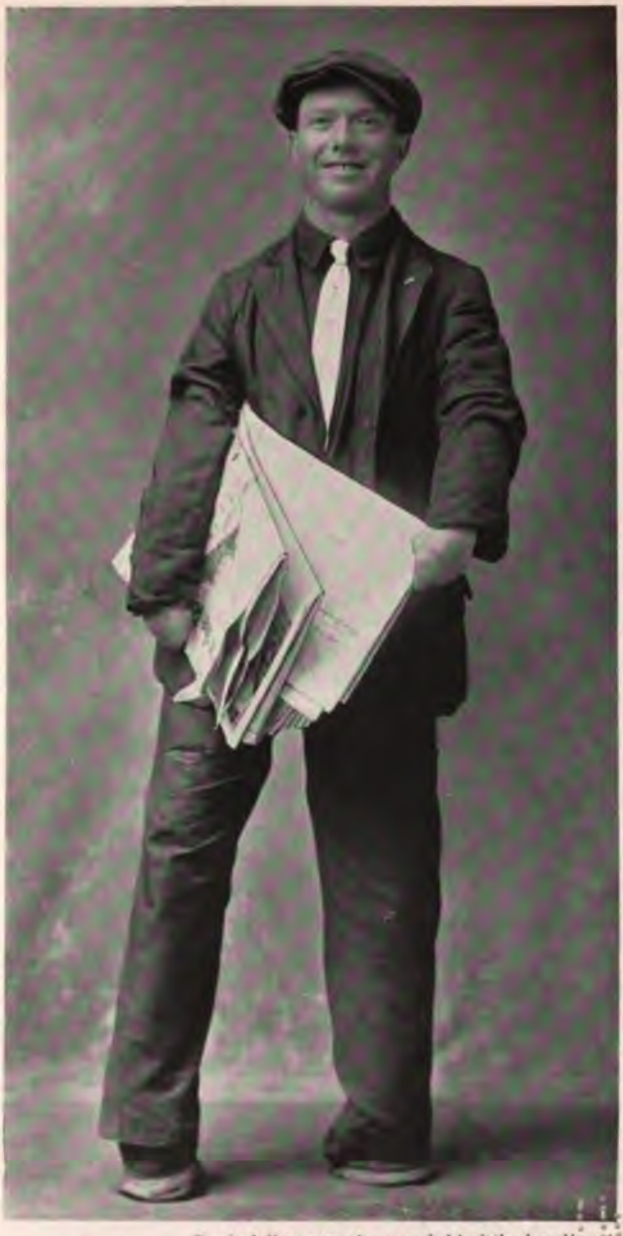
School seemed out of the question, but it was the only way she could get an education because her parents could not afford the expense of a private tutor, so when she was old enough an attempt was made to send her to school. She went for only two years. This was not for lack of a warm reception from the teachers, but because she was not strong enough to endure the strain.

As she grew older, and realized the burdens and responsibilities of life, she observed that her mother had much hard and heavy work to do. Her brothers and sisters were contributing their share to the family income, which was needed because her father had died, and because an epileptic brother was becoming more and more of an invalid. She felt growing within herself a desire to be useful, to do some kind of work, but what should it be?

Happily, she had a natural taste for domestic work, and little by little discovered that there were many light tasks that could be done from a wheel chair. She began by wiping dishes. Presently she washed and put them away. As time went on, she did innumerable tasks, setting the table, making beds, and, last of all, assisting with the cooking. All of this she did in spite of the fact that it was difficult, almost impossible, indeed, for her to stoop to any extent.

After she had gained confidence in herself and become more forgetful of her natural longing to run about with other girls and share in their good times, she became interested in sewing, showing much natural ability and decided artistic sense. Her own family, to whom she was devoted, and who were devoted to her, permitted her to experiment upon them and were greatly pleased with the gowns she made. Gradually her sister's friends came and asked her to make gowns and waists for them, too. This was an unexpected result, and brought much joy and happiness. Now she had many friends of her own and a profitable business. Now and then one of her friends when going to a party in a gown that she had made, stopped on the way to let her see how fine the gown looked. It was not altogether easy to fit the gowns, and her own family were puzzled to see how she would do it. But she was inventive, and a visitor in working hours might even have seen ladies standing on chairs to have their skirts hung. Although she could not operate a sewing machine by foot power, she learned to run it by hand with the use of a long iron poker to extend her reach to the pedals. She fitted the poker-handle into the machine pedal, using the poker-crook to hold by. (See picture.) An electric attachment has since been suggested in its place, but can hardly give more satisfaction than the discovery that first made possible running a machine by use of her own strength.

When asked what she thought most desirable for crippled people, she replied: "Happiness and friends, which I am sure they cannot have unless they find the work they



Don't fail to note the man behind the handicap!

most enjoy, and work which may give them a chance to express themselves. I believe, too, that they need guidance at times, as I have shown by my wasted years, before I realized I could do something. Most of us are sensitive because people think we are so different. We realize our difference physically, but that makes it so much harder for us to show what we really are. I have been happy in my work, not because it brought me money, but because it was good enough to have value and because it brought me real friends, who gave me glimpses of the world I knew so little about. This was my school."

Unfortunately, the sweet, gentle, and courageous woman is very delicate, and has grown increasingly so. For the present her work must be curtailed. She was glad to contribute her story and picture to this report.

A MAN WHO LOST HIS RIGHT ARM AND FOREMAN'S POSITION THROUGH INDUSTRIAL ACCIDENT

(See picture, facing page 68)

An interesting man is the cripple who rehabilitated himself after losing his right arm below the elbow at the age of forty-seven. The accident occurred while he was at work. For a time his future looked unpromising. The temptation to succumb to a hopeless attitude toward life was great. The thing that saved him was an understanding and sympathetic family who stimulated him to believe in himself, to face the world, return to work, and make good.

This man had come from a family of very limited means. It had been possible for him to have only a grammar school education before it was time for him to strike out in the working world and try his hand at a real job. He had been first employed in a school-desk and machine company, where he learned woodworking. He remained in this and a similar concern for nine years. Then an opportunity came for him to go into a furniture factory, where he was employed as sander. This job entails the running of a scraper (see picture, facing page 68), which requires operating three levers with the left hand, while the right guides the wooden patterns. One day, when he had been employed as sander several years—two years as foreman—he was teaching a new man how to operate the machine. In the process the pupil unfortunately forgot to cut off the power at the right moment, the teacher caught his sleeve in the moving machinery, suffering the loss of his right arm below the elbow.

His employers were very fair, he thought, for they paid hospital and doctor's bills, gave him a small sum of money in addition, and held his job for him. This seemed about as much as he could expect, although, of course, it was a tremendous disappointment to him. After a short period, he had an artificial arm made and returned to work. For two years matters went as smoothly as one could expect under such circumstances.

Unhappily for this man, during this time the bank in which he had deposited his and his wife's savings of a lifetime failed, and there was no immediate prospect of repayment of even the smallest sum of money. This, in addition to the nervous shock, resulting from his accident, had a most serious effect upon his nerves, and he found it impossible to do his work well. He lost all confidence in himself, and could not assume the responsibility of directing the workmen who were his charge; so, of his own choice, he asked to be released from his job as foreman and returned to his old job as sander.

Compliance with his request seemed doubtful and impossible, but he persisted, showing an invention of his own making to replace his arm, and make mechanical work possible. With the aid of this appliance, which can be seen in the illustration, facing page 68, the worker can sweep, wheel a wheel-barrow, and lift a heavy weight. By demonstrating its usefulness, he persuaded his employer that he could do his old work as sander. He has now been using the device at his occupation for many years. When not at work, he slips the contrivance in his pocket.

The road has not always been smooth for this workman. The factory has changed hands, and although his old employer promised him a life job, he has naturally had to demonstrate his worth to his new employer. "It is the old story," he said, "of attempting to remove the prejudice of able-bodied people that a cripple cannot do normal work. If my family had not believed in me, I should never have had the courage to keep going. With this invention of mine, they saw me use my knife and fork, cut my food, etc., and so were confident that I could continue working. I appreciate that you must convince your employer not only that you can do the work, but that you can do it with as much rapidity and efficiency as your competitors. This I was able to do, and if you wish to assist cripples, always keep this in mind. Offer only what the cripple has, and not what you wish he had, and he will then be chosen on merit."

When the visit was made to the factory where this cripple is employed, his fellow-workmen, who were enjoying their noon-hour, were not only interested in the taking of the picture, but were eager to see his invention appreciated, and urged that it should be patented as well as another invention he was working on for safeguarding machinery.

ARMLESS LAWYER[1]

David Moylan Overcame Heavy Odds
Educated Himself After Being Crippled on Railroad

(See picture, facing page 164)

A remarkable instance of what optimism and pure grit can accomplish in the face of almost impossible obstacles is presented in the life story of David Moylan, 1509 Howard

---

[1] Reprinted from *New York American*, 1909.

Avenue, Cleveland, perhaps the only armless lawyer in the United States.

Moylan passed the bar examination held at the state capital a short time ago. Owing to his crippled condition authorities offered to make concessions for him in the answering of hundreds of written questions, but he smilingly refused them.

"I'll take my chances with the rest of the boys," he said.

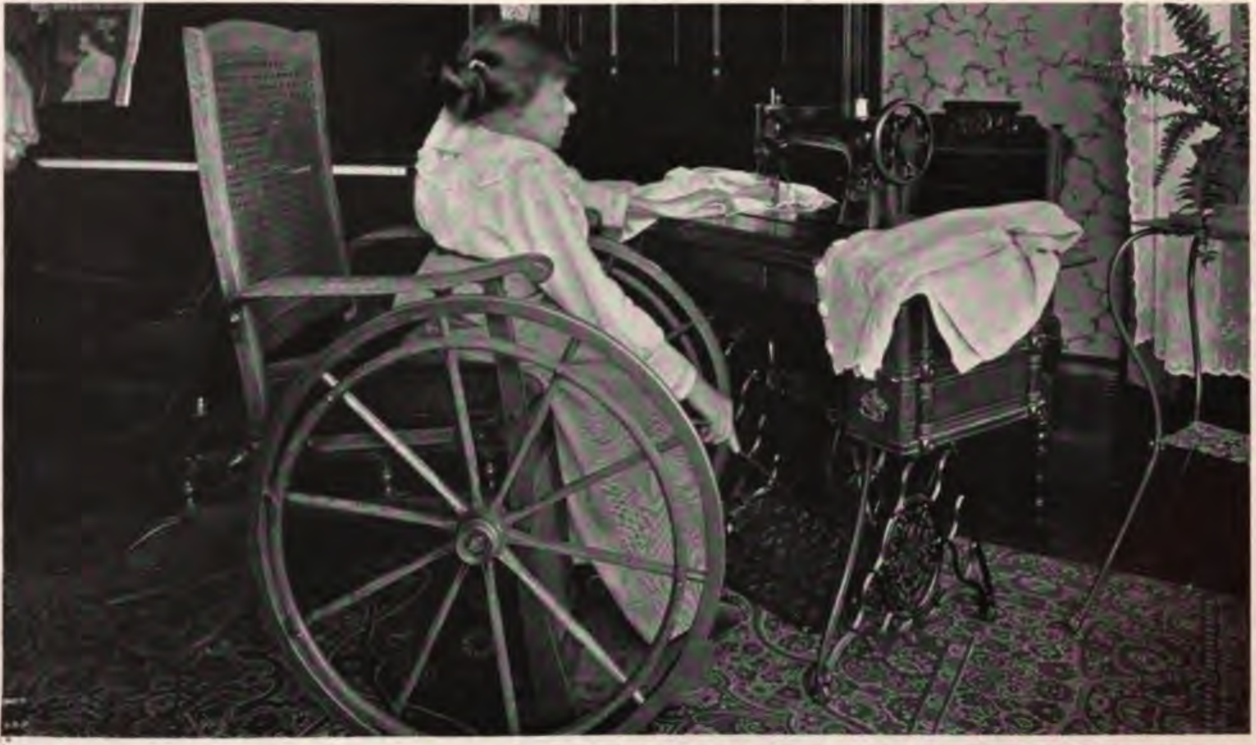
And so, holding the pen in his teeth, he answered all the questions put to the applicants. There were scores of them. And Moylan completed his papers far ahead of the majority of his class and ranked seventh in a class of nearly 200.

So proficient has Moylan become in writing with pen or pencil held between his teeth that he writes quite as rapidly as does the ordinary man in the ordinary way and far more legibly than ninety per cent of the more fortunate people.

His life story is one of hardship and misfortune, surmounted in the end by determination and stick-to-it-iveness with generous doses of cheerfulness mixed in. At an early age his father died, leaving him the sole support of a widowed mother. He left the parochial school he was attending and got a job on the railroad. In a short time he was promoted to brakeman.

His consistently good work attracted the attention of his superiors. He was slated for promotion, but the glory was snatched from him. In 1896 his right arm was crushed near the shoulder while he was coupling cars. He laid in the hospital for weeks but never once did his optimism leave him.

"Don't worry," he used to tell his mother. "Things will come out all right. I've got one good arm left. When I get out I'll make it do the work of two."



Successful dressmaker who runs her machine with the aid of a long iron poker

Back to railroading he went, this time assisting the yardmaster. He surely made good his promise—his left arm was doing the work of two. And then one night in 1904 a switch engine ran him down. It was dark and blizzardy and he couldn't see the train coming until it was on him.

When he got out of the hospital months later his left arm was gone—amputated near the shoulder. He was armless. But he didn't quit or whine. He plugged. He got odd jobs wherever he could land them. He sold real estate and insurance, and then he decided to become a lawyer, attending the night school in this city.

His friends tried to dissuade him. "You can't make good," they told him. "Crippled as you are you won't be able to keep up with your classes."

But Moylan only smiled and persisted in his resolve. It was a stupendous task that confronted him. Not only was he compelled in three years' time to complete the entire law course, but owing to the fact that he had never attended high school, he was forced through a provision in the Ohio law, to complete the full four-year high school course. In short, to do seven years' work in three, and he did it.

He worked days and studied nights. He used his teeth in turning pages and wrote his essays with the pen held in his teeth. He studied far into the morning hours and then was up again at sunrise plugging for business that would keep things going in his home.

The friends who tried to dissuade him first point to him with pride now. Prominent lawyers in the city, interested in his marvelous achievement, have offered him connections with their firms.

Moylan takes his successes modestly. "Anyone can do the same thing," he said. "All that's necessary is to be optimistic and keep fighting. There's no use laying down. Have faith in yourself and take every misfortune that comes to you and think it's an instrument that will some day work to your good."

A ONE-ARMED AUTOMOBILE REPAIRER WHO MADE GOOD THROUGH HIS OWN EFFORTS

I remember well my visit to a man who had lost his right arm below the elbow. His home was in a respectable neighborhood of detached cottages. As I entered the small, well-kept yard, I hesitated as to whether I should go to the back or front door. Wishing to cause as little trouble as possible to the housewife, whom I could imagine might be busy at the noon hour, I decided upon the former. In response to my knock, a man's voice bade me "Come in." I entered a large, sunny kitchen, where the cripple was briskly 'washing up', as he called it, for dinner. He continued, and in response to my introduction asked who I was, where I came from, the purpose of such a survey, and the source of its financial support. He emphatically stated that he did not wish to be connected with any philanthropic scheme. I explained everything, from the purpose to the source of our finances, even giving the names of our committee members. When I finished, he said: "I call that a fine piece of educational work, for you are not only learning about us, you are teaching the people of Cleveland that we are not an idle, begging lot, but men and women like the rest of you—with your good qualities and your failings. We want the same chance that you have had. We want you all to see us as we are, genuine men and women, with physical differences, but the same otherwise, and able to hold our own with you if given the opportunity."

He then invited me to join his wife in the living-room, where he told the following story.

He was one of a large family, whose parents were respectable, hard-working people. After graduating from grammar school, feeling the necessity of earning money and having a decided mechanical interest, he decided to become a machinist, which trade he learned, later becoming a steam-fitter. He became skilled in this trade. Unfortunately, at the age of twenty-four years, he met with an accident while at work, which resulted in his present disability. The company made no settlement, as they considered the accident due to his own carelessness; so after remaining out of work three months, he 'grit his teeth' and determined to use his savings for educational advancement. He took a special course in mechanical engineering at a technical college, which he soon realized was too much for him, considering his meager education. But he was not easily discouraged, and went to another institution in a distant city, where he took a course in mechanical drawing. At the end of a year he asked those in charge to give him a chance in their workshop, which request they at first refused, but later employed him. Here he did all kinds of drafting. After a few years he went back to his native city, studied to be a first class engineer, got his license, and applied for a job. He now met his greatest obstacles. Unconsciously, he had a habit of putting his disabled arm in his pocket when interviewing a prospective employer, and often was on the point of securing a much desired job, when the arm would as unconsciously come out of his pocket, and the possibilities for work were gone. In sheer desperation, one day, after being refused many times, he returned to one employer and said: "How do you know what a one-armed man can or cannot do? You have never hired one. Why don't you hire one and give him the chance to show what he can do? Don't be prejudiced because of his disability." He was hired at his own risk, as first class engineer on one of the Lake steamers, in which job he remained about fifteen years, earning $175.00 a month. Because of his wife's ill-health, he gave up recently, and has an automobile repair shop where he can do all kinds of work, repairing automobiles and installing heaters. He can use all kinds of tools.

In discussing the problems of cripples, he gave from his own experience and good judgment this advice: "Don't judge," he said, "all cripples by the loafers on the street corners. They are usually so from their own choice, or from ill-timed help from their friends. Don't make us a separate class. We are the same as the rest of you. Judge us by what we have, not by what we have lost. Put aside philanthropic schemes, but stand ready to give us helpful advice when we are disabled, by steering us into the right occupation. Tell us about other cripples who have been successful. Provide educational opportunities and training for crippled children. Remember cripples can usually make good if they have determination, provided the community receives them with the right spirit. Remember, also, they have moments of great discouragement, and these are the times when they are in great need of work."

DON'T FAIL TO NOTE THE MAN BEHIND THE HANDICAP

(See picture, facing page 212)

Quite by chance, one day, in wandering purposelessly through the square in Cleveland, I was attracted by the agility and swiftness with which one young man was securing his large bundles of newspapers from the newspaper truck. He was surrounded by a number of other newsboys who were all after their share, for this was the system of distribution of the various newspapers. Keenly interested because he seemed so businesslike, I observed a little more closely, and at first was shocked to see that he had club hands and club feet. Although unable to use his hands at all, he managed to use his arms cleverly, and experience had taught him how to tuck away almost any size package under his arms. I wedged my way through the crowd (this is a center for various car-routes, hence the crowd), through the group of boys, until I reached him. I asked if I might speak to him for a few minutes. It was a busy time and, although he had read of the Survey and was mildly interested, he could not talk then, so agreed to come to our office on the following Saturday.

He came at the appointed time, very evidently having taken the time and trouble to go home and change from his work-day to his Sunday clothes. He was a fine-looking young man, of rugged build and keen blue eyes, who appeared to be the personification of happiness and geniality, despite his handicap. During the entire Survey we met with no other cripple, regardless of degree of disability, or financial circumstances, who impressed us more strongly with firmness of character, fine attitude toward life, and cheerful acceptance of duties and responsibilities. It was a real privilege and pleasure to know him. He had been crippled from birth. Very simply he said his parents were Polish immigrants, who had never been to school; could neither read nor write Polish; and never spoke a word of English. Through somebody's persuasion they came to America and settled in a remote district of Kansas, where the father secured work as a laborer with wages $1.10 a day. Here the cripple was born, the oldest of twenty-one children. Up to the time he was five or six years old no thought was given to consulting a doctor about him. His mother had employed a midwife at birth. At last, however, he was taken to a nearby city, to see a doctor, who said he might cure him for $500. This represented a small fortune to these simple people, a sum that they might hope to accumulate for their old age, but far beyond their dreams at this time. So the little boy was taken home, and never again was a doctor consulted by the parents. No special shoes had been advised, so until the brothers and sisters were big enough to drag him in a cart, he was carried about by first one, and then another. Until he was twelve years old he was entirely dependent upon younger brothers and sisters for getting about. Then a change in residence completely altered his life. Better opportunities for work were sought by the father in Cleveland, and there he took his family. One day, as this crippled boy was being dragged about by his brothers, a shoemaker who lived near them saw him, looked at his feet, and said: "If you come into my little shop I will make you some shoes that will enable you to walk, and I will teach you to make them, so that you may always have shoes." From that time life was transformed. No longer was he dependent upon his brothers, and best of all, he could now go to school for the first time in his life. These were happy days for him, but because of insufficient income and a large and constantly increasing family, his education was limited to five years' schooling. In response to my question, if during these school years any teacher or neighbor had suggested going to a hospital or consulting a physician, he said: "Oh no, and our family never knew there was a hospital. You see they were so ignorant—through no fault of their own—they never knew enough to make inquiries, and they never mingled with neighbors. Their life was entirely apart, probably because they neither spoke, nor understood, English."

The only kind of work that seemed possible for this boy was selling newspapers, so he secured his corner and did a most profitable business. To be sure, he has to depend upon his customers to make their own change and have free access to his pocketbook. Nevertheless, he always found them to be honest. He has had many of the same customers for years.

Life seemed bright until the enforcement of the statute which prevented cripples from exposing their deformity by selling on street corners abolished this man's job. Although it seemed rather hard, he appreciated the meaning of it, but considered it ill-advised unless some step went with it for providing other opportunity for work for cripples. His family had begun to depend upon his contribution to the weekly income, and needed this money sadly. Wasn't he a full-grown man and shouldn't he contribute his share? With his savings of $400, he bought out a small cigar and newsstore. This proved to be a poor investment, because he was too dependent upon others to help him, and the profits were not sufficient to allow him to hire help. The undertaking was consequently abandoned, and through the kindness of the druggist in front of whose store he had previously been accustomed to stand selling papers, he was given permission to use his doorway as long as he liked. This is his selling place today, and he is a man thirty-five years of age.

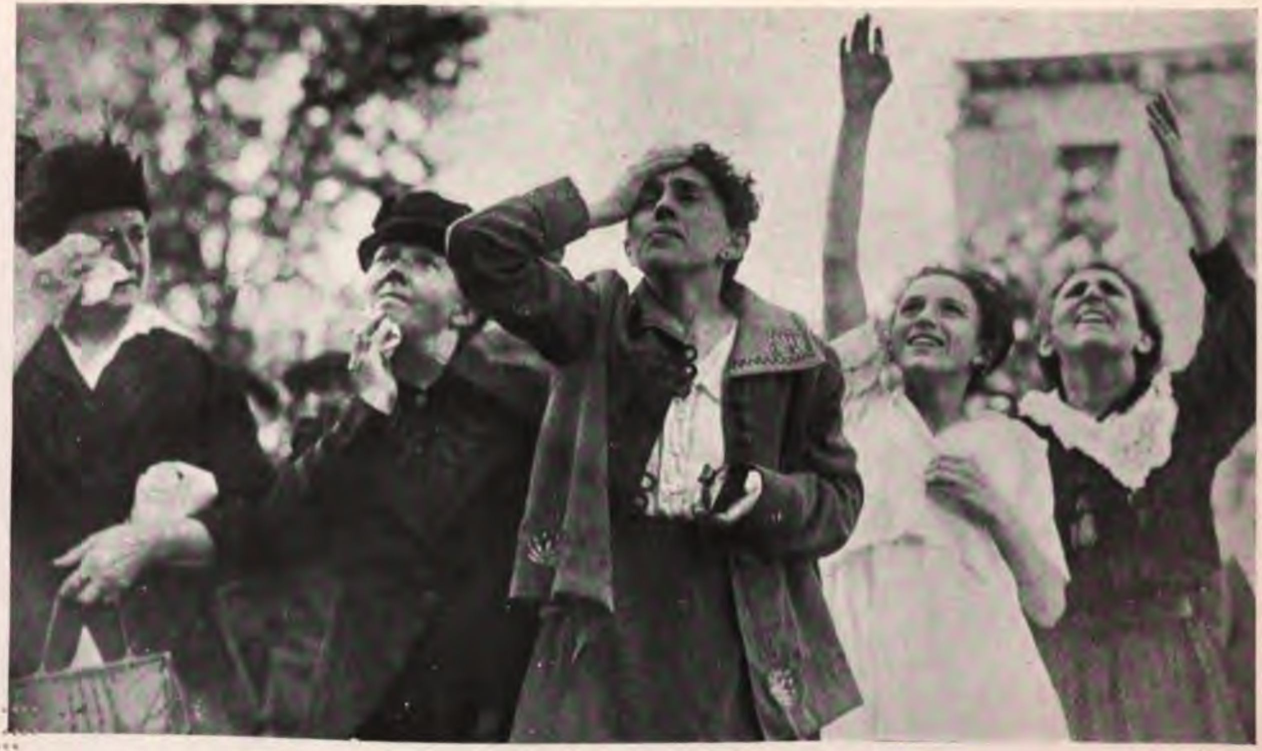
When I suggested to him that it might be worth while even now to consult a specialist, he said: "No, my life is satisfactory to me as it is. I have a married sister with two little children to support, and also two young sisters to support. I am eager to send my sisters to high school so they may have a chance in life, and they can perhaps then help the other children. My parents are dead and I feel responsible for these members of my family, and also for a mature brother and sister who make their home with us and need my guidance. My life doesn't really matter to myself, but it does count with all my family. They need me. Only a few weeks ago a doctor spoke to me on the street, and he said if I came to a distant city, he might help me by operating. I not only cannot afford that expense, but I cannot afford the time. If I left home, everything would go to pieces. I am not unhappy; in fact, I am happy in my work. Think of the many types of people I meet, and think how much I learn to teach my little family to avoid. Best of all, I am out-of-doors. After all, I have no complaint to make. My parents did the best they knew how. But, if you start work with cripples, educate them; train them; and educate your community and your employers especially, because they cannot be burdened with helpless people, and you have to show them that there is a difference in cripples who apply to them for work. The newspaper trade is no trade for a cripple, but I am thankful for it, because there is nothing else I could do with no use of my hands, unless I could have had an education like Judge Moylan who is without both arms (see story, page 215). I wish you success in your undertaking."

Perhaps his philosophy of life—thinking entirely of others and not of himself—was his unconscious reason for happiness.

ONE-ARMED LOCKSMITH

(See picture, facing page 84)

It was not very long after we began the Survey that we all became so interested in our quest for cripples, that we found ourselves unconsciously looking for them in our moments of leisure. So there was some excitement in our first few weeks when one of our workers who had not yet begun investigating—in fact no interviewing cripples had yet been done—came into the office and announced that while in a locksmith's shop for personal business, she had seen a one-armed locksmith at work there. Since this was her discovery, she was to have the first opportunity to interview him. Unfortunately, he failed to respond to any letters, and unsuccessful attempts were made to see him where he roomed. I, then, took my turn at attempting to make an appointment. I wrote letters to which no response came; I called at his place of residence evenings and Sundays, but was always 'too late'. He had always



Mothers of Children with Infantile Paralysis, 1916 Epidemic, Newark, N.J.

Reproduced by permission of the Central News Photo Service

'just gone out'. It seemed best not to persist, as we were sure we could locate him later. Happily, one day a letter came in which he said he had not been well and so had been unable to make an appointment with us, but that he would be glad to come and answer any questions we might like to ask.

The evening came when I was to see him, and I waited rather disappointedly until nine o'clock when he came, though rather late.

He was a shy man, very unaccustomed to talking about himself, especially about his disability which he had grown used to after these many years. He was rather particular about the Survey, and wished to have a clear understanding about it. In response I explained to him fully, as I should to anybody. He felt satisfied, and proceeded to tell me the following story. When he was a child (he is now fifty-one years old) it was the custom in poor families to send the children to work at an early age. This custom was followed by his parents who were poor and had a large family to support. They were then living in Pennsylvania, and at the age of twelve years he was sent to work in a barrel factory, where he earned a few dollars a week. As far back as he could recall he was interested in all kinds of mechanical proceedings. The very motions of machinery were fascinating to him, and although his own work was to turn a machine which cut barrel staves, and was perfectly safe, he became over-curious one day in watching the process, leaned over too far, and caught his sleeve in the machine, losing his right arm close to his shoulder. As it was due to his own carelessness, although the machinery was unprotected, there was no question of settlement. However, the company did offer to give him a life job, at the rate of $5.00 a week. Very shortly after, there were changes in his own family, his mother having died, and his father having married again. About this time, when he was fourteen or fifteen years old, an aunt residing in Cleveland urged him to come and live with her. To be sure, she was poor, too, but he was welcome to share what she had. An attempt was made for him to resume his education, as he had not completed the grammar school course. In order to go to school for a couple of years, he had to earn enough money to buy his clothes. So he sold newspapers on the street corners. But he was always made conscious of his physical defect by his comrades, who delighted in teasing him about such an apparent handicap. Maybe it was in fun, but it hurt, and so tended, from these early days, to make him refrain from making friends, and he found himself living his life largely within himself.

When it seemed impossible for him to go to school any longer, although he had not graduated from grammar school, he accepted with alacrity the chance to become a messenger boy for the Western Union Telegraph Company. While he was in their employ, he made the acquaintance of an elevator operator in a family hotel. This man, undoubtedly feeling sorry for him, suggested that an elevator operator's job was the one for him, and if he cared to consider learning, he would teach him. This seemed a better chance with more money, so he accepted his offer and not long after had his own job, operating with his left hand. He remained at this work for nine years.

During all these years he was saving, for he had ambitions to do something with tools, and he amused himself 'tinkering', as he called it, with all kinds of tools, which he had purchased from time to time. Unexpectedly an opportunity came in which he bought a small 'tinkering shop'. Here he mended clocks and tins, and so forth. He enjoyed it tremendously and was never so happy in all his life. However, he was not making much more than a living, so when a friend offered him a good chance to become a watchman with an attractive wage he accepted, and sold out his little shop which had been such a joy to him. The call of the little shop was strong in him, however, and after several years he bought out another little shop, and in addition to doing all kinds of repairing made keys, which he had learned to do in his unoccupied hours. He had a profitable business and was successful and happy. Nine years ago he had a good opportunity to take his present job, and he is considered by his co-workers as a highly skilled locksmith. He manages as well without his arm, and even better than others with two arms. Very deftly he tightens the vise with his right knee, and the rapidity with which he works is amazing.

During our conversation, he betrayed no bitterness toward life. His only regret was that he had not had a better education, because he would have enjoyed pursuing further his mechanical interests. Anticipating our interest, he stated with deep conviction that he had never wanted any opportunity because he was disabled. In fact, he wished this not to be noticed or remarked. He was modest about his contribution, but glad to give it, if it could be of service to others, although he did not wish it to attract attention of the public to him as a cripple.

It was not easy for him to express his views about the future of cripples, as he evidently lived much alone, and talked little. However, he did say they should never be called cripples, because it made them seem different, and that they should have education and training. He added: "If you have something to offer, you can usually get a job, but you must be sure that what you have to offer is of real value."